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WATER QUALITY REPORT 1993

METROPOLITAN DISTRICT COMMISSION

DIVISION OF WATERSHED MANAGEMENT

QUABBIN RESERVOIR WATERSHED
WARE RIVER WATERSHED

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METROPOLITAN DISTRICT COMMISSION
DIVISION OF WATERSHED MANAGEMENT
ENVIRONMENTAL QUALITY SECTION

1993 WATER QUALITY REPORT

SUMMARY

Water quality sampling and watershed monitoring make up an important part of the overall mission of the Metropolitan District Commission Division of Watershed Management (MDC-DWM). During 1993, the monitoring program saw expansions in the number of routine sample stations as well as a greater commitment towards special water quality studies. Special investigative samples were collected for evaluation of migratory gull impacts on reservoir water quality, MDC deer hunt activities, and water quality trends in Cadwell Creek.

The DWM continued its efforts in monitoring the impacts of migratory gull populations on bacterial quality at the Chicopee Valley Aqueduct (CVA). On seven (based on MWRA results) occasions during 1993, gull numbers, location and/or inclement weather conditions resulted in fecal coliform concentrations exceeding EPA's allowable raw water quality limit of 20/100ml. Growing gull population levels in the area prompted the DWM to compliment reservoir harassment efforts with a landfill harassment program beginning in late December. As a result of DWM actions, water supplied via the CVA during 1993 met all of EPA's turbidity and coliform bacteria requirements. A summary of DWM harassment efforts and results has been provided in a report entitled, *Gull Control Activities on Quabbin Reservoir - 1993-94* (see Appendix B).

Ware River water supplemented reservoir supplies during a ten day span from March 31 through April 9th. The quality of water being diverted to the reservoir is monitored at both shaft 8 (Quabbin Aqueduct intake works in Barre) and shaft 11A (Aqueduct outlet entering Quabbin). Figure 1 shows 1994 fecal coliform concentrations monitored at shaft 8. As shown, concentrations had exceeded EPA's 20 fecal coliform standard roughly 15% of the time. However, only two exceedences occurred during the allowable diversion period from October 15 through June 1. Water supplied from Quabbin to Wachusett reservoir saw no adverse effects as a result of supplementary Ware River supplies as water quality leaving the reservoir monitored at shaft 12 met all of EPA's raw water quality standards for the year.

The ongoing monitoring for pH and alkalinity levels of tributary streams and the reservoir continued to highlight deficiencies in buffering capacities. Figure 2 depicts how pH and alkalinity levels within the reservoir at Shaft 12 have related to one another for the period 1950 to present. While the pH values have stayed relatively stable, alkalinity values continue to slide warranting concern over possible stresses that may be placed on many aquatic species should environmental conditions trigger an increase in acidic inputs.

Ware River at Shaft 8
1993 Fecal Coliform Bacteria

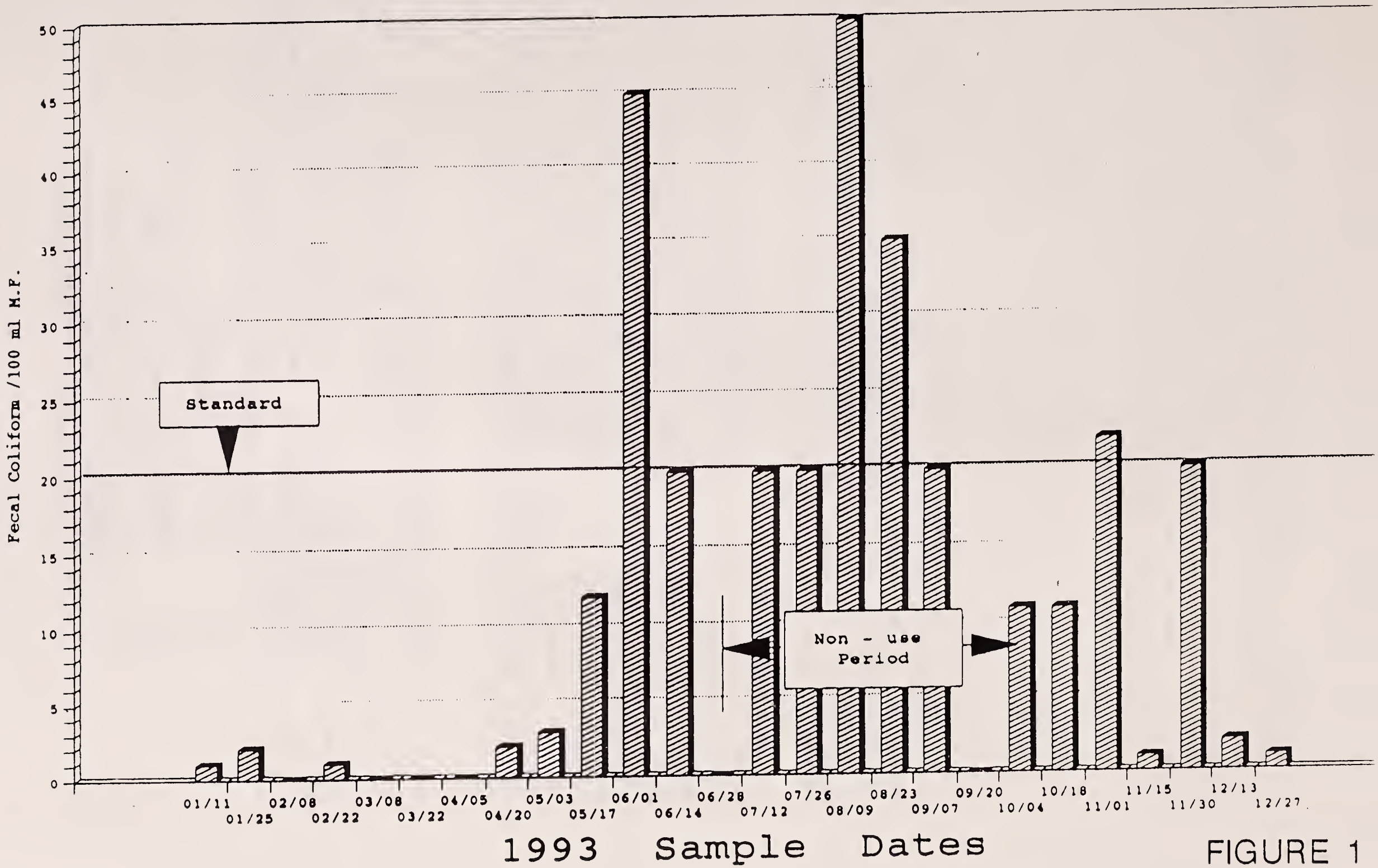

FIGURE 1

Quabbin Reservoir at Shaft #12 (206)

Yearly Averages for pH and Alkalinity

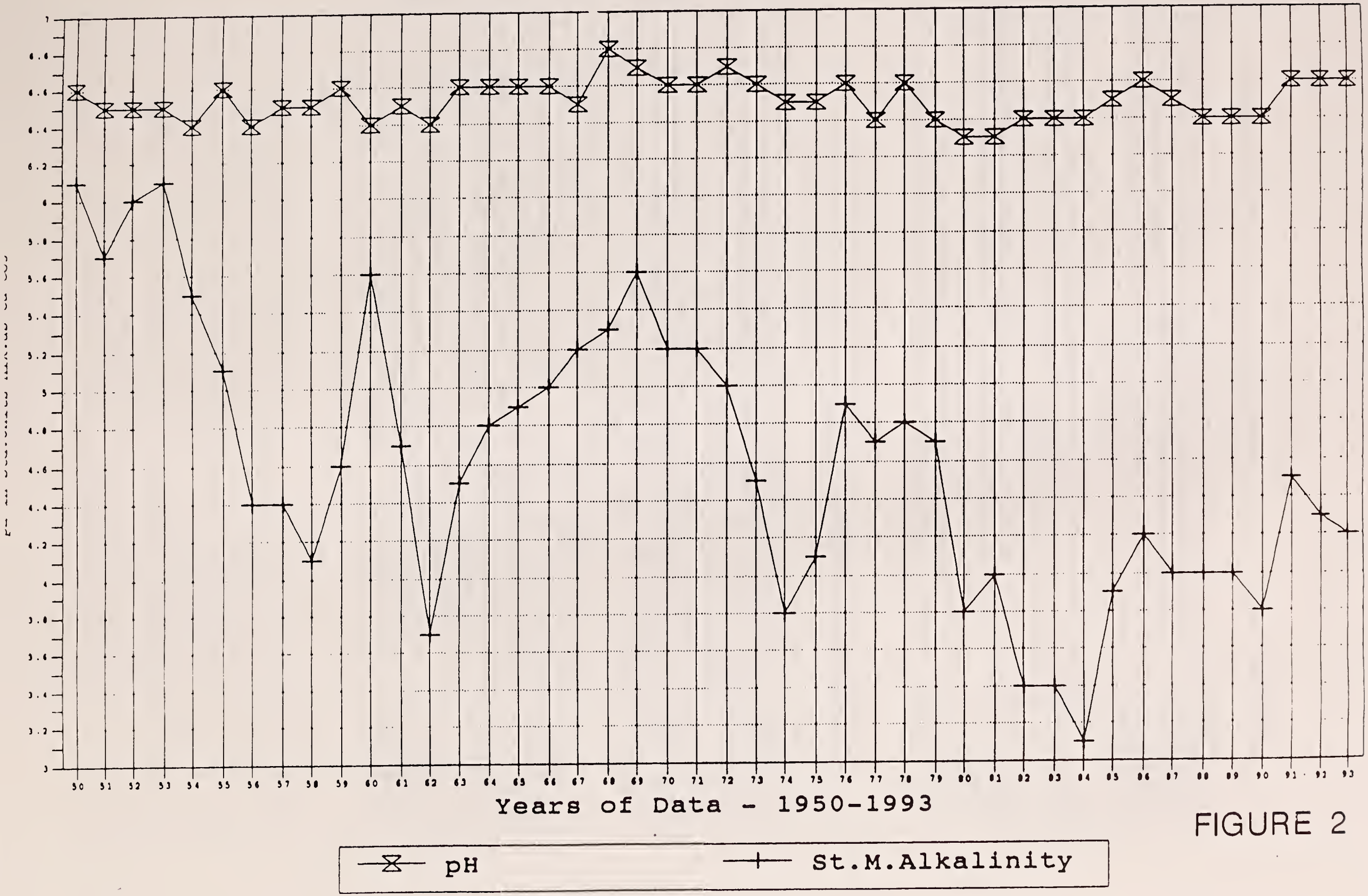

FIGURE 2

1.0 INTRODUCTION

The Metropolitan District Commission Division of Watershed Management was established in 1984 by the Massachusetts Legislature. The Division was created to manage and maintain a system of watersheds and reservoirs and provide pure water to the Massachusetts Water Resources Authority (MWRA).

The 1993 Quabbin and Ware River Water Quality Report is one in a series of annual water quality summaries prepared by the MDC Division of Watershed Management. This report contains all the water quality data produced by the MDC Quabbin Environmental Quality Section during calendar year 1993. Also included are data produced for the MDC by Revet Laboratory, a private, DEP certified laboratory. A companion report which describes results of water quality testing in the Wachusett Reservoir drainage basin is also available from the Division.

1.1 MDC WATERSHED SYSTEM

The Quabbin reservoir collects water from fourteen major streams and rivers in addition to a countless number of smaller tributaries and connectors. The reservoir watershed includes portions of the towns of Athol, Barre, Belchertown, Hardwick, New Salem, Orange, Pelham, Petersham, Phillipston, Shutesbury, Wendell, and Ware. A total of 187.4 square miles (37.7 square miles of reservoir surface area alone) are contained within the watershed domain. The Quabbin reservoir serves as the primary supply for 43 metropolitan Boston communities as well as three communities in western Massachusetts.

The Ware River watershed has an area of 96.3 square miles and includes portions of the towns of Barre, Hubbardston, Oakham, Phillipston, Princeton, Rutland, Templeton, and Westminster. Water from the Ware River watershed may be diverted to Quabbin Reservoir through Quabbin Aqueduct intake works at Shaft 8, located in the town of Barre. Diversion of water in excess of 85 million gallons per day (MGD) from the Ware River is allowed from October 15 through June 1. Diversions from June 1 to June 15, and from October 1 to October 15 may occur with permission from the Department of Environmental Protection, Division of Water Supply.

1.2 WATER QUALITY SAMPLING OBJECTIVES

Water quality sampling and watershed monitoring activities are carried out by the Environmental Quality section, including staffing in the Boston office, at Wachusett Reservoir in Clinton, and at Quabbin Reservoir in Belchertown. This report summarizes the results of water quality testing conducted in the Quabbin and Ware River watersheds during 1993. A separate report which summarizes the results of water quality testing in the Wachusett watershed during 1993 is also available from the MDC.

The objectives of the water quality sampling and analysis program conducted by the DWM Environmental Quality Section are as follows:

1. To assess the bacteriological quality of the sources of public water supply to protect the public health;

2. To assess the ecological health and vitality of the reservoirs in response to reservoir operation and fluctuation and in response to both internal and external inputs and reactions;

3. To enable the DWM to identify and correct present or potential threats of contamination or degradation of the reservoirs and tributaries within the watershed system;

4. To enable the DWM to assess compliance of the reservoirs and tributaries with applicable state and federal water quality criteria for public surface water supply sources.

2.0 WATERSHED SAMPLING PROGRAM DESCRIPTION

An intensive program of water quality sampling and analysis is conducted by the MDC with in-house staffing using MDC laboratory facilities. The DWM performed weekly analysis for turbidity, alkalinity, pH, dissolved oxygen, conductivity, and total and fecal coliform. Color, chloride, hardness, iron and total and fixed solids were analyzed quarterly on thirty-one sampling stations. Additional laboratory analyses for nutrients, metals, and organics, are provided by consultant contract services. During the period covered by this report, Revet Laboratory in Worcester, Massachusetts provided contract laboratory services for the Division.

Quabbin Environmental Quality (EQ) staff collected routine water quality samples from a total of thirty-seven stations on twenty-nine tributaries and the reservoir. Additional stations were sampled for special studies and further investigation. EQ staff collected a total of one thousand six hundred and nine (1,609) samples during 1993. Approximately 10 analyses were conducted on each sample. Therefore, the Quabbin laboratory conducted approximately 16,000 analyses during 1993. Revet laboratory analyzed 48 additional samples with approximately 18 analyses conducted on each sample. Total analyses conducted for 1993 were approximately 17,000.

Standard methods were used for field and lab analysis (refer to Table 1). All data collected is recorded in permanent laboratory books located at the Quabbin Water Quality Lab and transferred as well to an electronic database.

TABLE 1

METHODS USED FOR FIELD AND LABORATORY ANALYSIS
QUABBIN LABORATORY

PARAMETER	STANDARD METHOD
Turbidity	SM 2130 B
pH	SM 4500-H+ B Hydrolab Surveyor II Orion 811 meter
Alkalinity	SM 2320 B (low level)
Chloride	SM 4500-Cl C
Hardness	SM 2340 C
Color	SM 2120 B
Conductivity	HACH DREL/5 meter Hydrolab Surveyor II
Temperature	YSI Model 57 DO meter, Hydrolab Surveyor II
Dissolved Oxygen	YSI Model 57 DO meter Hydrolab Surveyor II
Iron	HACH DR/3 Spectrophotometer
Total Solids	SM 2540 B
Fixed Solids	SM 2540 E
Total Coliform	SM 9222B
Fecal Coliform	SM 9222 D

SM = Standard Methods for the Examination of Water and Wastewater - 18th edition, 1992

2.1 SAMPLING STATIONS

The 1993 watershed sample stations included sites on all major and most minor tributaries flowing directly into either the Quabbin reservoir or Ware River. Three reservoir stations were also selected where temperature, dissolved oxygen, pH and conductivity profiles were determined monthly during the months of May through October (samples were not collected from the reservoir during the months of April and November due to the late thawing of Reservoir ice and adverse weather conditions). The stations are described in Tables 2 and 3 and shown on Figures 3 and 4. Data collected from the reservoir and the tributary sampling locations are presented in Appendix A.

The Quabbin tributary sampling schedule and locations were essentially the same as in 1992 with a few additions. Three tributary sites were added. They were a small tributary of the East Branch of the Swift, in Petersham on Route 122, just east of the Grange Hall, and two sites on Rand Brook. The Petersham site was added due to concerns over the location and concentration of septic systems noted during a previous sanitary survey of the area. The two Rand Brook stations were added on the North and South branches in order to determine the cause of high bacteria and turbidity found downstream at the traditional sampling site (216B) during 1992. No changes were implemented for the Ware River watershed sampling program in either 1993 or 1992. However, during 1991 extensive revision of sampling locations and frequencies had occurred.

Table 2
1993 Quabbin Watershed Sampling Stations

Frequency	Station	Location
BM	(211) West Branch Swift River	Rt. 202
BM	(213) Middle Branch Swift River	Gate 30
BM	(216) East Branch Swift River	Rt. 32A
BM	(211BX) Cadwell Creek	At mouth
BM	(212) Hop Brook	Gate 22
BM	(212X) Hop Brook	At mouth
BM	(215A) West Branch Fever Brook	Womens Fed. Forest
BM	(215) East Branch Fever Brook	West St. Petersham
BM	(216B) Rand Brook	Rt. 32A
BM	(216B-1) Rand Brook - North Branch	@ Racoon Hill Road
BM	(216B-2) Rand Brook - South Branch	Off Racoon Hill Road
BM	(211A) Atherton Brook	Rt. 202
W	(206) Quabbin	Shaft 12 (shore)
W	(201) Quabbin	Outlet
BM	(XXX) Petersham	Petersham, Rt. 122 East of Grange Hall
M	QR01/202	West Arm opposite Winsor Dam
M	QR06/206	Quabbin Lake/opposite Shaft 12
M	QR10	Off Den Hill

Frequency: W = weekly
BM = bimonthly
M = monthly

note: "QR" indicates that samples are collected from the reservoir where sampling is only conducted during the months of April through November.

QUABBIN WATERSHED

1993 SAMPLE SITES

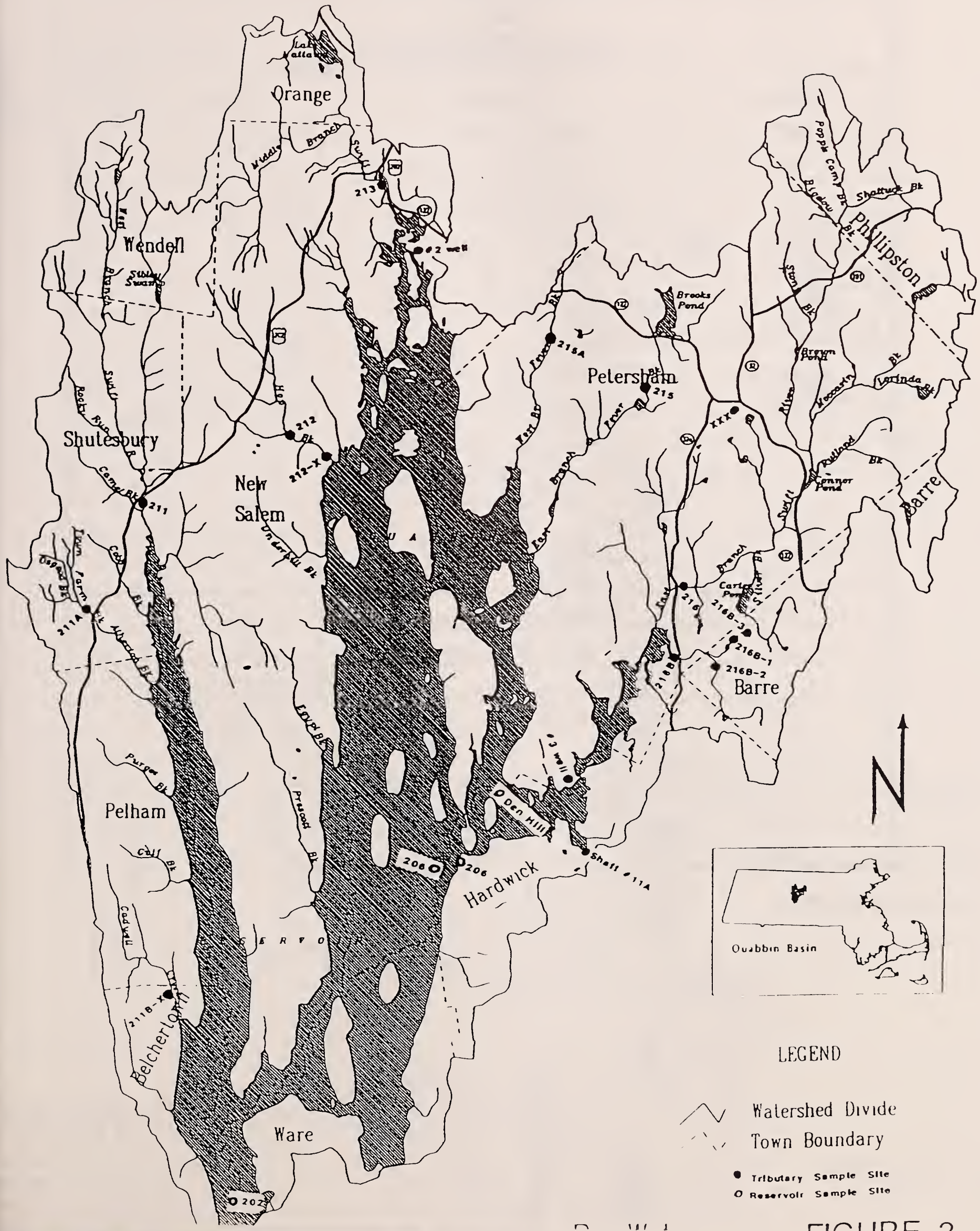

FIGURE 2

Table 3
Ware River Watershed
1993 Tributary Sampling Stations

Frequency	Station	Location
BM	(111) Queen Lake	Road culvert
BM	(112) Burnshirt River	Williamsville
BM	Natty Pond Brook	Hale Road
BM	(104) Canesto & Natty Brooks	Rt. 62
BM	(103) Burnshirt River	Rt. 62
BM when flowing	Ware River	Shaft 11A
BM	Ware River	Shaft 8
BM	(102) Parker Brook	Near mouth
BM	(110) Long & Whitehall Pond	Outlet
BM	(107) West Branch Ware River	Rt. 62
BM 7/13 thru 8/24	Asnacomet Pond	Beach
BM	(115) Brigham Pond	Outlet
BM	(116) Asnacomet Pond	Outlet
BM	(105) Ware River	Barre Falls
BM	(108) East Branch Ware River	New Boston
BM	(109) Longmeadow Brook	Near mouth
BM	(121) Mill Brook	Charnock Hill Rd
BM	(119 Demon Pond	Outlet

Frequency:
W = weekly
BM = bimonthly
M = monthly

WARE RIVER WATERSHED

1993 SAMPLE SITES

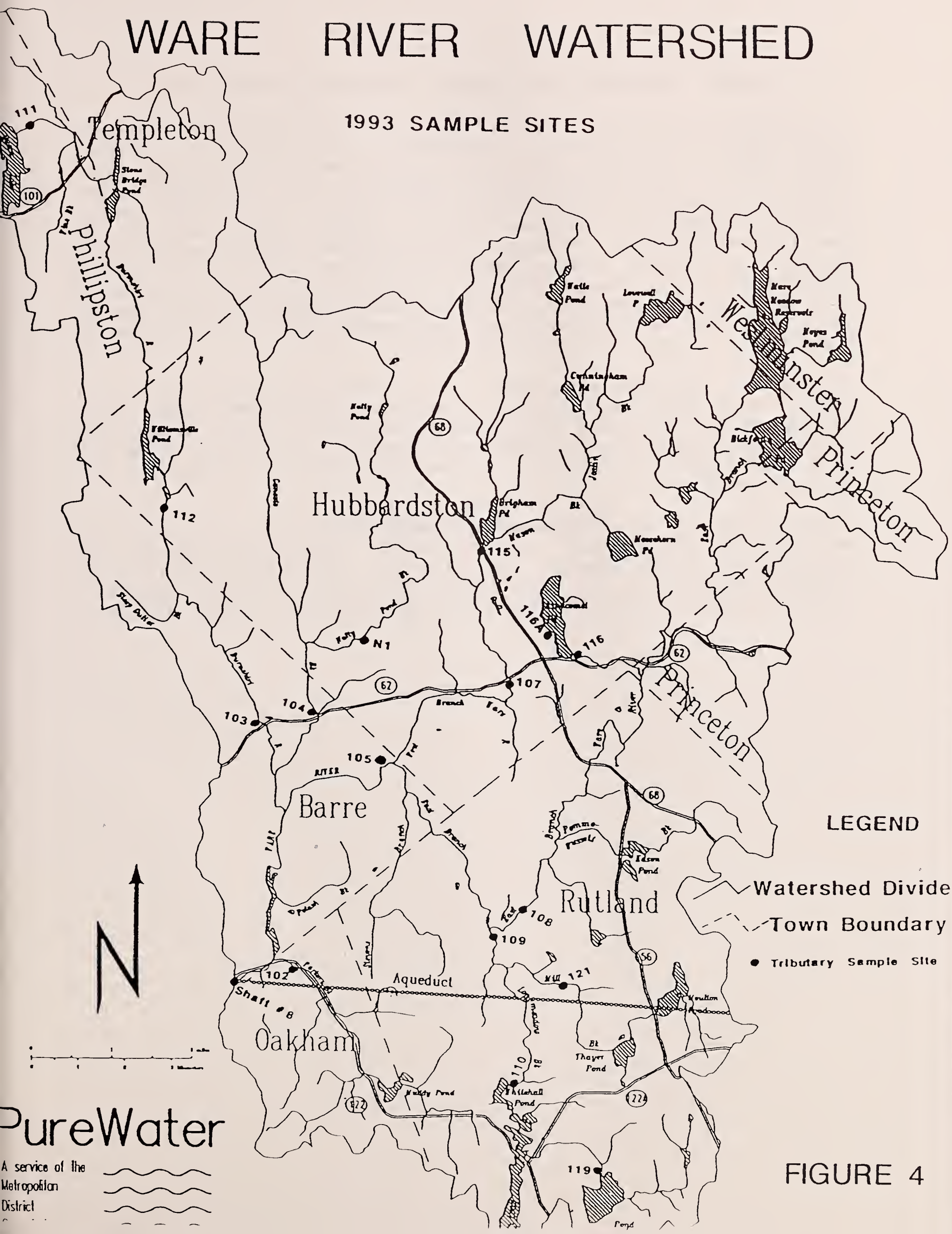

FIGURE 4

3.0 SPECIAL INVESTIGATIVE SAMPLES - QUABBIN AND WARE RIVER

Additional samples were collected from the Winsor Dam sampling location (202) in response to bacterial contamination from gulls. Water sampled from this location characterizes the quality of water which enters the Chicopee Valley Aqueduct (CVA) and supplies the towns of Chicopee, South Hadley, and Wilbraham. Beginning November 1 until November 22, samples were collected 4 days a week in the AM; following the 22, PM sample collection was added; and starting December 6, samples were collected seven days a week with AM and PM samples collected Monday through Friday with only a PM sample collected on the weekends. Drinking water leaving the CVA during 1993 meet all raw surface water requirements of the Massachusetts Department of Environmental Protection.

Turbidity, and total and fecal coliform analysis were conducted on sixty-three locations prior to and during the MDC deer hunt. Locations were selected where hunting activities were concentrated and/or potential threats suspected. Based on field observations and stream sampling results, no negative impact on water quality was observed.

When necessary, studies were conducted to monitor site-specific effects of development and non-point source pollutants from potential problem areas. In addition, MDC water distribution systems were tested for lead levels and student interns conducted a water quality study on Cadwell Creek during the summer and fall.

4.0 APPENDIX A
WATER QUALITY DATA TABLES

MDC QUABBIN LABORATORY REPORTING UNITS

Parameter	Unit
Depth	meters
Dissolved Oxygen	mg/l
Temperature	degrees centigrade
Specific conductance	micromhos per cm
pH	standard units
Turbidity	NTU
Standard alkalinity	mg/l as CaCo3
Hardness	mg/l as CaCo3
Alkalinity	mg/l as CaCo3
Color	color units
Fecal coliform bacteria	colonies/100 ml
Total coliform bacteria	colonies/100 ml
Nitrate-nitrogen	mg/l
Nitrite-nitrogen	mg/l
Kjeldahl-nitrogen	mg/l
Total phosphorus	mg/l
Chlorides	mg/l
Silica	mg/l
Aluminum	mg/l
Arsenic	mg/l
Copper	mg/l
Chromium	mg/l
Iron	mg/l
Lead	mg/l
Mercury	mg/l
Nickel	mg/l
Zinc	mg/l
Total organic carbon	mg/l
Oil and grease	mg/l
Volatile organics	micrograms/l
Solids	mg/l

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4.1 QUABBIN RESERVOIR WATERSHED TRIBUTARIES WATER QUALITY DATA

QUABBIN LABORATORY RECORDS 1993
(201) QUABBIN RESERVOIR @ OUTLET BUILDING

SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL	ELEV. GAGE
12	01/04	0.3				6.6	4.2	2.4	11.8	91	4				40	2	1	
13	01/05															3	2	
14	01/06															2	1	
15	01/07															1	0	
33	01/11	0.3				6.5	4.0	2.2	12.0	89	3				40	20	20	
34	01/12															11	7	
35	01/13															5	5	
36	01/13															6	2	
37	01/14															3	3	
38	01/14																3	
50	01/19	0.3				6.6	4.2	2.3	12.5	90	2				40	3	2	
51	01/20															2	1	
52	01/21															0	0	
70	01/25	0.3				6.6	4.3	2.7	12.7	92	2				40	8	4	
71	01/26															4	3	
72	01/27															2	1	
73	01/28															1	1	
85	02/01	0.3				6.6	4.3	2.6	12.8	93	2				40	1	1	
86	02/02															6	6	
87	02/03															1	1	
88	02/04															4	0	
105	02/08	0.3				6.6	4.3	2.4	13.1	92	1				40	1	1	
106	02/09															0	0	
107	02/10															0	1	
108	02/11															4	5	
120	02/16	0.3	5	5.0	8.2	6.5	4.2	2.3	13.2	93	1	29	19	0.02	40	4	4	
125	02/17															5	1	
126	02/18															2	1	
143	02/22	0.3				6.5	4.0	2.2	13.1	95	2				40	1	1	
144	02/23															2	1	
145	02/24															1	2	
146	02/25															1	0	
168	03/01	0.3				6.5	4.4	2.4	13.2	95	2				40	2	2	
169	03/02															0	0	
170	03/03															0	0	
171	03/04															0	1	
188	03/08	0.3				6.5	4.2	2.4	12.7	92	2				40	0	0	
189	03/09															0	0	
190	03/10															0	0	
191	03/11															1	0	
192	03/15															0	0	
203	03/16	0.3				6.5	4.0	2.6	12.8	93	2				40	0	0	
204	03/17															0	0	
205	03/18															0	0	
222	03/22	0.3				6.5	4.2	2.2	12.5	90	2				40	0	0	
223	03/23															0	0	
224	03/24															0	0	
225	03/25															0	0	
235	03/29	0.3				6.5	4.1	2.2	12.9	93	2				40	0	0	
240	03/30															1	0	
241	03/31															0	0	
242	04/01															0	0	
261	04/05	0.3				6.5	4.3	2.6	12.8	93	2				40	0	0	
266	04/06															0	0	
267	04/07															0	0	

CONTINUED

QUABBIN LABORATORY RECORDS 1993
(201) QUABBIN RESERVOIR @ OUTLET BUILDING

	SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. TOTAL	COLIFORM COLONIES PER 100 ML. FECAL	M.P. ELEV. GAGE
	279	04/12	0.3				6.5	4.1	2.6	13.2	98	3				40	4	4	
	284	04/13															3	3	
	285	04/14															4	3	
	286	04/15															7	6	
	304	04/20	0.3				6.5	4.1	2.4	12.9	99	4				40	0	1	
	309	04/21															2	1	
	310	04/22															0	0	
	322	04/26	0.3				6.6	4.2	2.3	12.2	95	5				40	0	0	
	327	04/27															2	2	
	328	04/28															0	0	
	329	04/29															0	0	
	347	05/03	0.3				6.5	4.0	2.4	13.0	104	6				40	0	0	
	361	05/10	0.3	5	5.5	9.1	6.5	4.0	2.6	12.2	98	6	31	21	0.02	40	1	0	
	379	05/17	0.3				6.6	4.3	2.6	12.0	101	8				40	1	0	
	393	05/24	0.3				6.6	4.2	2.7	11.8	97	7				40	0	0	
	509	06/01	0.3				6.5	4.0	2.7	12.5	106	8				40	0	0	
REVET	523	06/07	0.3		5.7	9.7	6.6	4.0	2.7	12.0	101	8				40	0	0	
	545	06/14	0.3				6.6	3.9	2.5	12.2	106	9				40	0	0	
	652	06/21	0.3				6.6	3.9	2.6	11.8	100	8				40	0	0	
	671	06/28	0.3				6.6	4.1	2.6	11.7	103	10				40	0	0	
	685	07/06	0.3				6.5	4.2	2.8	11.6	102	10				40	1	0	
	704	07/12	0.3				6.5	4.0	2.7	10.8	98	11				40	0	0	
	806	07/19	0.3				6.6	4.2	2.6	11.2	101	11				40	0	0	
	825	07/26	0.3				6.6	4.2	2.7	11.1	100	11				40	0	0	
	840	08/02	0.3				6.6	3.9	2.6	11.5	106	12				40	0	0	
	859	08/09	0.3				6.6	3.9	2.8	11.3	104	12				40	0	0	
	968	08/16	0.3	5	5.8	9.1	6.5	3.8	2.6	10.6	100	13	34	19	0.02	40	0	0	
	986	08/23	0.3				6.5	4.0	2.7	11.0	102	12				40	0	0	
	1000	08/30	0.3				6.5	3.9	2.9	10.8	100	12				40	0	0	
	1017	09/07	0.3				6.4	4.3	2.4	11.0	104	13				40	1	1	
	1029	09/13	0.3				6.5	3.8	2.7	10.4	98	13				40	0	0	
	1135	09/20	0.3				6.5	4.2	2.4	11.6	110	13				40	0	0	
	1150	09/27	0.3				6.4	4.5	2.8	10.1	97	14				40	1	0	
	1165	10/04	0.3				6.4	4.5	2.5	9.7	92	13				40	2	1	
	1268	10/12	0.3				6.6	4.4	2.6	10.2	98	14				40	1	2	
	1285	10/18	0.3				6.6	4.6	2.5	9.4	91	14				40	1	0	
	1300	10/25	0.3				6.6	4.5	2.8	9.6	91	13				40	2	0	
	1318	11/01	0.3				6.6	4.3	2.3	9.7	90	12				40	9	4	
	1326	11/03															5	1	
	1360	11/04															2	4	
	1375	11/08	0.3	5	6.0	8.8	6.6	4.4	2.4	9.9	89	11	25	12	0.02	40	10	7	
	1383	11/09															2	1	
	1415	11/15	0.3				6.5	4.2	2.1	9.9	89	11				40	4	1	
	1423	11/16															3	1	
	1424	11/17															22	13	
	1425	11/18															7	5	
	1440	11/22	0.3				6.6	4.4	2.3	11.2	97	9				40	2	1	
	1441	11/22															2	2	
	1446	11/23															3	2	
	1447	11/23															6	3	
	1448	11/29															21	12	
	1449	11/29															14	14	
	1478	11/30	0.3				6.6	4.5	2.7	10.1	87	9				40	10	7	
	1493	12/01															12	5	

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QUABBIN LABORATORY RECORDS 1993 REVET ANALYSIS

(201) QUABBIN RESERVOIR @ OUTLET BUILDING

DATE SAMP	KJELDAHL -N	AMMONIA -N	NIT-RITE -N	NIT-RATE -N	ORTHO PHOS-PHORUS	TOTAL PHOS-PHORUS	ALUM-INUM	CAD-MIUM	COP-PER	NICKEL	LEAD	ZINC	IRON	CAL-CIUM	ARSENIC	MERCURY	CHRO-MIUM	MANG-ANESE
06/07	1.57	<0.05	<0.01	<0.1	<0.01	0.08	0.032	<0.004	0.022	<0.03	<0.001	0.011	0.036	2.24	<0.004	<0.0002	<0.009	0.005

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NO DATA

QUABBIN LABORATORY RECORDS 1993
(201) QUABBIN RESERVOIR @ OUTLET BUILDING

SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL	ELEV. GAGE
1494	12/02															5	5	
1495	12/02															3	0	
1517	12/06	0.3				6.6	4.4	2.5	10.2	86	8				40	60	58	
1518	12/06															38	17	
1519	12/07															17	21	
1520	12/07															18	12	
1521	12/08															14	12	
1522	12/08															17	9	
1523	12/09															11	12	
1524	12/09															15	9	
1525	12/10															10	5	
1526	12/10															13	6	
1527	12/11															6	1	
1528	12/12															5	5	
1547	12/13	0.3				6.6	4.4	2.5	10.9	90	7				40	44	39	
1548	12/14															39	40	
1549	12/14															17	15	
1550	12/15															19	20	
1551	12/15															14	19	
1552	12/16															22	19	
1553	12/16															35	50	
1554	12/17															65	48	
1555	12/17															32	28	
1556	12/18															22	23	
1557	12/19															17	11	
1572	12/20	0.3				6.6	4.3	2.3	11.2	95	8				42	36	15	
1573	12/20															LA	18	
1574	12/21															18	17	
1575	12/21															12	9	
1578	12/22															11	5	
1579	12/22															6	2	
1580	12/23															6	5	
1581	12/23															5	3	
1582	12/24															7	8	
1583	12/26															0	0	
1600	12/27	0.3				6.6	4.3	2.6	11.3	88	5				40	0	0	
1601	12/27															0	1	
1602	12/28															4	4	
1603	12/28															1	0	
1604	12/29															2	2	
1605	12/29															3	8	
1606	12/30															4	1	
1607	12/30															1	1	
1608	12/31															2	0	
1609	12/31															0	0	
AVG.		0.3	5	5.5	9.0	6.54	4.18	2.52	11.6	96	8	29	17	0.02	40	6	5	
MAX.		0.3	5	5.8	9.7	6.6	4.6	2.9	13.2	110	14	34	19	0.02	42	65	58	
MIN		0.3	5	5.0	8.2	6.4	3.8	2.1	9.4	86	1	25	12	0.02	40	0	0	

12/20 FECAL COLIFORM result used for TOTAL COLIFORM result in place of LA when figuring totals.

QUABBIN LABORATORY RECORDS 1993
(206) QUABBIN RESERVOIR @ SHAFT #12

	SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL	ELEV. GAGE
	11	01/04	0.3				6.6	4.5	2.8	12.6	91	2				40	0	0	
	32	01/11	0.3				6.6	4.2	2.5	12.7	92	2				40	1	0	
	49	01/19	0.3				6.6	4.0	2.1	13.3	91	0				40	1	0	
	69	01/25	0.5				6.6	4.2	2.5	13.7	94	0				40	1	0	
	84	02/01	0.3				6.6	4.3	2.4	13.8	103	3				40	1	0	
	104	02/08	0.3				6.6	4.7	2.8	14.0	96	0				43	0	0	
	119	02/16	0.4	5	5.5	10.2	6.6	4.4	2.4	14.4	98	0	32	19	0.02	42	1	0	
	142	02/22	0.3				6.6	4.1	2.3	13.6	93	0				40	0	0	
	167	03/01	0.3				6.6	4.3	2.3	12.4	90	2				40	0	0	
	187	03/08	0.3				6.6	4.4	2.6	13.2	90	0				40	0	0	
	202	03/16	0.3				6.6	4.0	2.6	13.5	92	0				40	0	0	
	221	03/22	0.3				6.6	4.3	2.4	13.6	93	0				40	0	0	
	234	03/29	0.3				6.6	4.1	2.4	13.0	89	0				40	0	0	
	260	04/05	0.3				6.5	4.1	2.3	13.2	90	0				40	0	0	
	278	04/12	0.3				6.5	4.1	2.6	13.5	98	2				40	0	0	
	303	04/20	0.3				6.5	4.6	2.9	13.0	100	4				40	0	0	
	321	04/26	0.3				6.6	4.4	2.6	11.8	95	6				40	0	0	
	346	05/03	0.3				6.6	4.2	2.5	12.3	99	6				40	0	0	
	360	05/10	0.3	5	5.5	9.2	6.6	4.2	2.8	12.0	108	11	32	20	0.03	40	1	0	
	378	05/17	0.3				6.6	4.2	2.7	10.7	101	13				40	0	0	
	392	05/24	0.3				6.6	4.1	2.4	10.2	98	14				40	2	1	
	508	06/01	0.3				6.6	4.0	2.5	10.0	97	14				40	11	10	
REVET	522	06/07	0.3		6.0	8.7	6.6	4.0	2.4	9.8	97	15				40	0	0	
	544	06/14	0.3				6.6	4.0	2.5	9.5	100	18				40	6	1	
	651	06/21	0.3				6.6	4.0	2.6	8.6	94	20				40	8	0	
	670	06/28	0.3				6.6	4.1	2.8	8.9	99	21				40	9	2	
	684	07/06	0.3				6.6	4.4	3.1	8.5	98	23				40	3	0	
	703	07/12	0.3				6.6	4.0	2.8	7.8	93	25				40	4	0	
	805	07/19	0.3				6.7	4.5	3.0	8.0	92	23				40	6	0	
	824	07/26	0.3				6.7	4.3	2.9	8.0	90	22				40	6	0	
	839	08/02	0.3				6.6	4.0	2.6	8.1	95	24				40	8	2	
	858	08/09	0.3				6.6	3.9	2.5	7.8	90	23				40	1	0	
	967	08/16	0.3	5	6.0	10.7	6.6	3.9	2.8	8.6	101	24	33	17	0.02	40	2	0	
	985	08/23	0.3				6.6	3.9	2.7	8.0	92	23				40	4	0	
	999	08/30	0.3				6.6	3.9	2.8	8.2	96	24				40	1	0	
	1016	09/07	0.3				6.5	4.2	2.6	8.1	93	23				40	15	0	
	1028	09/13	0.3				6.6	4.1	2.8	8.1	90	21				40	21	0	
	1134	09/20	0.3				6.6	4.2	2.3	8.2	88	19				40	2	0	
	1149	09/27	0.3				6.6	4.5	2.6	8.4	90	19				40	15	0	
	1164	10/04	0.3				6.6	4.1	2.2	9.0	91	16				40	12	0	
	1267	10/12	0.3				6.6	4.4	2.7	9.1	88	14				40	1	0	
	1284	10/18	0.3				6.6	4.3	2.4	9.6	93	14				40	50	1	
	1299	10/25	0.3				6.6	4.4	2.3	9.9	93	13				40	37	0	
	1317	11/01	0.3				6.6	4.4	2.3	9.8	90	12				40	20	0	
	1374	11/08	0.3	5	5.1	8.4	6.6	4.2	2.1	10.2	90	10	25	11	0.02	40	5	0	
	1414	11/15	0.3				6.6	4.3	2.3	10.0	90	11				40	40	0	
	1439	11/22	0.3				6.6	4.3	2.4	10.6	92	9				40	1	0	
	1477	11/30	0.3				6.6	4.4	2.4	10.5	89	8				40	1	0	
	1516	12/06	0.3				6.6	4.5	2.7	10.6	87	7				40	1	1	
	1546	12/13	0.3				6.6	4.6	2.9	11.6	91	5				40	0	0	
	1571	12/20	0.3				6.6	4.2	2.2	11.2	87	5				40	1	0	
	1599	12/27	0.3				6.6	4.3	2.2	12.6	89	1				40	1	0	
AVG.			0.3	5	5.6	9.4	6.60	4.23	2.54	10.7	94	11	31	17	0.02	40	6	0	
MAX.			0.5	5	6.0	10.7	6.7	4.7	3.1	14.4	108	25	33	20	0.03	43	50	10	
MIN.			0.3	5	5.1	8.4	6.5	3.9	2.1	7.8	87	0	25	11	0.02	40	0	0	

QUABBIN LABORATORY RECORDS 1993

(206) QUABBIN RESERVOIR @ SHAFT #12 REVET ANALYSIS

DATE SAMP	KJELDAHL -N	AMMONIA -N	NIT-RITE -N	NIT-RATE -N	ORTHO PHOS-PHORUS	TOTAL PHOS-PHORUS	ALUM-INUM	CAD-MIUM	COP-PER	NICKEL	LEAD	ZINC	IRON	CAL-CIUM	ARSENIC	MERCURY	CHRO-MIUM	MANG-ANESE
06/07	0.43	<0.05	<0.01	<0.1	<0.01	0.03	0.043	<0.004	0.009	<0.03	<0.001	0.008		2.14	<0.004	<0.0002	<0.009	0.004

QUABBIN LABORATORY RECORDS 1993
(211) WEST BR. OF SWIFT RIVER---RT.202

SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. TOTAL	COLIFORM COLONIES PER 100 ML. FECAL	M.P. ELEV. GAGE
1	01/04	0.2				6.2	3.8	1.7	13.7	94	0				38	5	3	
39	01/19	0.3				6.3	4.6	2.7	12.7	87	0				43	1	1	
74	02/01	0.2				6.4	4.4	2.4	14.2	97	0				42	4	1	
109	02/16	0.2	12	6.3	9.4	6.4	4.7	2.9	14.0	96	0	35	31	0.04	47	2	0	
157	03/01	0.3				6.4	4.9	3.1	12.8	88	0				45	1	0	
193	03/16	0.2				6.3	4.3	2.6	13.9	95	0				45	0	0	
226	03/29	2.0				6.1	3.3	1.0	12.4	85	0				52	19	15	
268	04/12	0.3				5.7	2.7	0.9	13.5	98	2				32	11	13	
311	04/26	0.2				6.1	3.2	1.6	10.6	92	9				40	3	0	
348	05/10	0.3	15	8.9	9.2	6.3	4.7	2.8	10.2	92	11	44	32	0.05	50	5	1	
380	05/24	0.2				6.3	4.4	3.0	9.5	84	10				52	8	9	
REVET 510	06/07	0.2		9.2	10.3	6.3	3.6	2.0	10.8	93	9				48	26	21	
641	06/21	0.3				6.6	6.6	5.2	8.7	86	15				70	70	23	
672	07/06	0.3				6.6	8.1	6.5	8.4	85	16				82	60	15	
795	07/19	0.3				6.7	9.1	7.1	8.5	84	15				100	110	12	
826	08/02	0.3				6.2	4.3	3.0	8.4	88	18				50	90	10	
954	08/16	0.3	18	13.3	15.4	6.5	7.3	5.8	8.4	85	16	58	42	0.23	77	40	13	
987	08/30	0.3				6.3	6.4	5.3	7.1	70	15				70	50	19	
1018	09/13	0.2				6.3	5.2	4.0	9.5	88	12				52	60	9	
1136	09/27	0.3				6.2	5.0	3.3	9.2	87	13				45	21	15	
1255	10/12	0.2				6.4	5.6	3.9	11.2	87	5				52	18	4	
1286	10/25	0.3				6.1	3.9	1.8	11.1	89	6				42	31	4	
1361	11/08	0.2	27	7.4	11.0	5.9	2.9	1.1	13.0	94	2	37	19	0.05	40	25	1	
1426	11/22	0.3				5.8	3.3	1.4	11.6	89	4				50	3	1	
1503	12/06	0.3				5.4	2.5	0.6	11.8	88	3				33	4	4	
1558	12/20	0.3				6.1	3.5	1.8	12.6	89	1				40	20	1	
AVG.		0.3	18	9.0	11.1	6.23	4.70	2.98	11.1	89	7	44	31	0.09	51	26	8	
MAX.		2.0	27	13.3	15.4	6.7	9.1	7.1	14.2	98	18	58	42	0.23	100	110	23	
MIN.		0.2	12	6.3	9.2	5.4	2.5	0.6	7.1	70	0	35	19	0.04	32	0	0	

QUABBIN LABORATORY RECORDS 1993

(211) WEST BR. OF SWIFT RIVER---RT.202 REVET ANALYSIS

DATE SAMP	KJELDAHL -N	AMMONIA -N	NIT-RITE -N	NIT-RATE -N	ORTHO PHOS-PHORUS	TOTAL PHOS-PHORUS	ALUM-INUM	CAD-MIUM	COP-PER	NICKEL	LEAD	ZINC	IRON	CAL-CIUM	ARSENIC	MERCURY	CHRO-MIUM	MANG-ANESE
06/07	0.25	<0.05	<0.01	<0.1	<0.01	0.22	0.128	<0.004	0.007	<0.03	<0.001	0.021	0.151	6.93	<0.004	<0.0002	<0.009	0.019

QUABBIN LABORATORY RECORDS 1993
(213) MIDDLE BR.OF SWIFT RIVER @ GATE #30

SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. TOTAL	COLIFORM COLONIES PER 100 ML. FECAL	M.P. ELEV. GAGE
2	01/04	0.4				6.3	6.5	4.3	11.1	76	0				53	5	4	
40	01/19	0.4				6.3	7.1	5.0	10.4	71	0				60	1	1	
75	02/01	0.4				6.3	8.0	5.8	10.7	73	0				60	3	1	
110	02/16	0.5	18	9.8	16.2	6.4	8.8	6.9	10.5	72	0	46	39	0.12	62	2	1	
158	03/01	0.5				6.4	9.5	7.6	10.8	74	0				62	2	2	
194	03/16	0.4				6.3	8.9	7.2	10.7	73	0				62	3	3	
227	03/29	0.8				6.2	5.3	3.4	12.4	85	0				42	27	27	
269	04/12	0.3				6.0	3.8	1.7	12.2	91	3				43	6	6	
312	04/26	0.3				6.2	6.3	4.4	7.8	71	11				53	5	5	
349	05/10	0.5	42	11.6	14.3	6.4	8.6	6.8	5.7	56	15	54	37	0.20	62	17	18	
381	05/24	0.5				6.3	9.3	7.5	7.6	72	13				62	35	26	
REVET 511	06/07	0.5		10.7	12.5	6.3	9.1	7.3	7.4	67	11				60	16	16	
642	06/21	0.7				6.5	16.8	15.1	5.1	54	18				80	130	83	
673	07/06	1.3				6.6	20.1	18.5	6.0	67	21				92	110	26	
796	07/19	2.0				6.8	22.2	20.2	6.1	66	20				95	50	22	
827	08/02	0.8				6.2	11.4	9.7	4.4	50	22				67	80	20	
955	08/16	1.3	55	13.9	19.2	6.6	16.3	14.8	5.8	64	21	73	47	0.68	82	30	19	
988	08/30	1.0				6.4	16.8	15.4	5.5	60	20				80	50	25	
1019	09/13	1.3				6.4	15.0	13.5	5.9	58	15				73	40	16	
1137	09/27	0.9				6.3	11.5	9.6	5.4	51	13				65	35	26	
1256	10/12	0.7				6.4	11.5	9.3	8.0	66	7				72	10	6	
1287	10/25	0.6				6.2	7.3	4.9	7.2	59	7				60	24	7	
1362	11/08	0.4	48	10.2	14.7	6.2	6.2	4.3	8.9	66	3	48	28	0.20	52	42	11	
1427	11/22	0.5				6.2	5.2	3.0	10.8	76	1				50	30	14	
1504	12/06	0.4				5.8	3.1	1.2	9.8	73	3				42	120	90	
1559	12/20	0.3				6.1	5.5	3.5	11.0	75	0				55	18	12	
AVG.		0.7	41	11.2	15.4	6.31	10.00	8.11	8.4	68	9	55	38	0.30	63	34	19	
MAX.		2.0	55	13.9	19.2	6.8	22.2	20.2	12.4	91	22	73	47	0.68	95	130	90	
MIN.		0.3	18	9.8	12.5	5.8	3.1	1.2	4.4	50	0	46	28	0.12	42	1	1	

QUABBIN LABORATORY RECORDS 1993

(213) MIDDLE BR.OF SWIFT RIVER @ GATE #30 REVET ANALYSIS

DATE SAMP	KJELDAHL -N	AMMONIA -N	NIT-RITE -N	NIT-RATE -N	ORTHO PHOS-PHORUS	TOTAL PHOS-PHORUS	ALUM-INUM	CAD-MIUM	COP-PER	NICKEL	LEAD	ZINC	IRON	CAL-CIUM	ARSENIC	MERCURY	CHRO-MIUM	MANG-ANESE
06/07	1.16	<0.05	<0.01	0.14	<0.01	0.02	0.092	0.009	<0.003	<0.03	<0.001	0.006	0.256	4.07	<0.004	<0.0002	<0.009	0.018

QUABBIN LABORATORY RECORDS 1993
(216) EAST BR. OF SWIFT RIVER @ RT.32A

	SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL	ELEV. GAGE
	3	01/04	0.5				6.4	4.1	2.0	13.9	95	0				57	8	4	1.94
	41	01/19	0.4				6.5	4.6	2.7	13.7	94	0				62	4	1	
	76	02/01	0.4				6.6	5.1	2.8	14.0	96	0				62	4	0	
	111	02/16	0.5	32	10.5	12.0	6.7	6.7	4.8	14.3	98	0	54	40	0.16	68	5	4	
	159	03/01	0.5				6.7	7.3	5.3	13.0	89	0				67	2	0	
	195	03/16	0.5				6.6	6.9	5.3	13.9	95	0				72	2	0	
	228	03/29	1.5				6.4	4.9	2.6	13.6	93	0				55	80	33	3.20
	270	04/12	0.4				6.1	3.0	1.3	12.9	96	3				40	6	7	2.36
	313	04/26	0.4				6.5	4.0	2.0	10.2	94	12				55	3	2	1.56
	350	05/10	0.6	47	14.0	10.1	6.6	5.2	3.2	9.5	96	16	53	37	0.23	62	4	0	1.20
	382	05/24	0.5				6.7	6.1	4.5	9.1	86	13				62	19	9	1.00
REVET	512	06/07	0.6		13.2	10.9	6.7	5.2	3.6	9.9	93	13				58	8	5	1.09
	643	06/21	0.5				6.8	7.2	5.7	8.7	91	18				72	120	40	0.70
	674	07/06	0.5				6.8	8.4	7.0	8.5	93	20				70	100	14	0.58
	797	07/19	0.5				7.0	8.9	7.2	8.6	90	18				67	40	13	0.50
	828	08/02	0.5				6.8	7.5	6.1	8.1	92	22				62	90	30	0.72
	956	08/16	0.4	37	13.4	12.7	6.8	8.1	6.5	6.9	75	20	58	38	0.27	70	110	70	0.56
	989	08/30	0.4				6.5	7.3	6.3	8.6	92	19				68	120	13	0.48
	1020	09/13	0.5				6.6	7.6	6.3	9.3	92	15				65	30	1	0.60
	1138	09/27	0.6				6.6	6.8	5.0	9.0	89	15				68	65	43	0.90
	1257	10/12	0.4				6.8	7.2	5.1	10.4	86	7				70	19	14	0.68
	1288	10/25	0.5				6.6	5.2	2.9	11.0	91	7				63	21	8	0.96
	1363	11/08	0.5	60	12.5	13.3	6.5	4.8	2.6	12.5	93	3	55	27	0.22	63	38	13	1.14
	1428	11/22	0.4				6.5	5.2	3.2	12.7	92	2				60	42	33	1.30
	1505	12/06	0.6				6.0	3.5	1.6	12.0	89	3				52	200	120	2.45
	1560	12/20	0.5				6.3	3.7	1.7	12.3	86	1				60	8	3	1.30
AVG.			0.5	44	12.7	11.8	6.58	5.94	4.13	11.0	91	9	55	36	0.22	63	44	18	
MAX.			1.5	60	14.0	13.3	7.0	8.9	7.2	14.3	98	22	58	40	0.27	72	200	120	
MIN.			0.4	32	10.5	10.1	6.0	3.0	1.3	6.9	75	0	53	27	0.16	40	2	0	

QUABBIN LABORATORY RECORDS 1993

(216) EAST BR. OF SWIFT RIVER @ RT.32A

REVET ANALYSIS

DATE SAMP	KJELDAHL -N	AMMONIA -N	NIT-RITE -N	NIT-RATE -N	ORTHO PHOS-PHORUS	TOTAL PHOS-PHORUS	ALUM-INUM	CAD-MIUM	COP-PER	NICKEL	LEAD	ZINC	IRON	CAL-CIUM	ARSENIC	MERCURY	CHRO-MIUM	MANG-ANESE
06/07	1.79	<0.05	<0.01	0.12	<0.01	0.10	0.144	<0.004	<0.003	<0.03	<0.001	0.005	0.435	2.86	<0.004	<0.0002	<0.009	0.028

QUABBIN LABORATORY RECORDS 1993
(211B-X) CADWELL BROOK @ MOUTH

	SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. TOTAL	COLIFORM COLONIES PER 100 ML. FECAL	ELEV. GAGE
	4	01/04	0.3				5.7	2.4	0.4	13.6	93	0				33	15	8	5.09
	42	01/19	0.4				5.8	2.8	1.0	14.2	97	0				33	0	0	
	77	02/01	0.3				5.9	2.9	0.9	14.0	96	0				33	3	4	4.82
	112	02/16	0.4	8	3.2	8.9	6.1	3.0	0.9	14.2	100	1	31	24	0.05	32	3	3	
	160	03/01	0.3				6.3	3.8	1.5	12.8	90	1				32	2	2	
	229	03/29	4.0				5.5	2.3	0.4	13.4	92	0				28	20	5	6.50
	271	04/12	0.3				5.5	2.2	0.3	13.1	100	4				30	7	.5	5.67
	314	04/26	0.2				5.8	2.4	0.6	10.8	95	10				32	2	1	5.12
	351	05/10	0.3	13	5.0	6.6	6.1	2.6	0.8	10.3	93	11	35	23	0.08	32	5	5	
	383	05/24	0.2				6.3	3.5	1.7	10.0	88	10				32	5	2	
REVET	513	06/07	0.2		5.5	8.0	6.3	3.7	2.2	10.9	94	9				32	18	15	
	644	06/21	0.2				6.5	4.8	3.4	9.1	90	15				32	90	45	
	675	07/06	0.2				6.6	6.3	4.8	8.7	88	16				32	10	0	
	798	07/19	0.2				6.7	7.3	5.6	8.7	86	15				33	30	13	
	829	08/02	0.2				6.6	6.0	4.4	8.3	85	17				33	150	10	
	957	08/16	0.1	8	3.1	9.0	6.7	7.0	5.6	8.8	89	16	42	31	0.04	33	100	13	
	990	08/30	0.2				6.4	7.0	6.2	8.7	88	16				37	110	12	
	1021	09/13	0.2				6.5	6.6	5.5	9.5	90	13				33	80	26	
	1139	09/27	0.2				6.4	5.2	3.4	9.1	88	14				50	100	63	
	1258	10/12	0.2				6.6	6.3	4.5	11.4	89	5				45	11	9	
	1289	10/25	0.2				6.4	4.0	2.3	11.4	94	7				50	15	4	4.35
	1364	11/08	0.2	12	6.9	12.2	6.0	3.1	1.4	13.4	97	2	37	23	0.04	43	22	2	4.56
	1429	11/22	0.2				5.6	2.1	0.2	12.4	92	3				40	16	2	
	1506	12/06	0.3				5.2	1.7	-0.1	12.4	95	4				40	9	1	5.96
	1561	12/20	0.3				5.7	2.5	0.6	11.8	85	2				38	5	1	5.23
AVG.			0.4	10	4.7	8.9	6.13	4.06	2.34	11.2	92	8	36	25	0.05	36	33	10	
MAX.			4.0	13	6.9	12.2	6.7	7.3	6.2	14.2	100	17	42	31	0.08	50	150	63	
MIN.			0.1	8	3.1	6.6	5.2	1.7	-0.1	8.3	85	0	31	23	0.04	28	0	0	

QUABBIN LABORATORY RECORDS 1993
(211B-X) CADWELL BROOK @ MOUTH

REVET ANALYSIS

DATE SAMP	KJELDAHL -N	AMMONIA -N	NIT-RITE -N	NIT-RATE -N	ORTHO PHOS-PHORUS	TOTAL PHOS-PHORUS	ALUM-INUM	CAD-MIUM	COP-PER	NICKEL	LEAD	ZINC	IRON	CAL-CIUM	ARSENIC	MERCURY	CHRO-MIUM	MANG-ANESE
06/07	0.52	<0.05	<0.01	<0.1	<0.01	0.23	0.149	<0.004	0.006	<0.03	<0.001	0.013	0.146	1.68	<0.004	<0.0002	0.009	0.009

QUABBIN LABORATORY RECORDS 1993

(212) HOP BROOK-GATE #22

	SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. TOTAL	COLIFORM COLONIES PER 100 ML. FECAL	ELEV. GAGE
	5	01/04	0.4				6.7	6.6	4.5	13.7	94	0				65	9	4	
	43	01/19	0.4				6.7	7.7	5.9	13.2	90	0				72	6	2	
	78	02/01	0.4				6.7	7.6	5.6	13.6	93	0				68	4	3	
	113	02/16	0.4	10	13.2	13.5	6.8	8.2	6.1	14.1	96	0	52	41	0.08	72	1	1	
	161	03/01	0.4				6.8	8.6	6.3	12.4	85	0				70	2	0	
	230	03/29	4.5				6.4	5.8	3.9	13.2	90	0				65	90	41	
	272	04/12	0.3				6.4	4.2	2.5	13.3	99	3				52	3	3	
	315	04/26	0.3				6.8	6.2	4.4	11.0	95	9				67	14	9	
	352	05/10	0.3	18	13.2	13.6	6.8	8.1	6.5	10.4	94	11	57	45	0.12	70	16	8	
	384	05/24	0.4				6.8	8.9	7.0	9.9	87	10				70	14	11	
REVET	514	06/07	0.3		14.1	12.9	6.8	8.9	7.4	10.5	93	10				70	17	14	
	645	06/21	0.5				6.9	12.1	10.7	8.9	90	16				85	150	46	
	676	07/06	0.7				6.8	13.6	11.9	8.4	87	17				92	80	40	
	799	07/19	1.8				6.8	17.2	15.3	6.6	68	17				80	250	120	
	830	08/02	0.7				6.7	12.4	11.0	8.4	88	18				110	300	90	
	958	08/16	0.9	28	19.5	20.3	6.8	14.6	13.2	8.1	83	17	78	55	0.47	105	200	26	
	991	08/30	1.2				6.4	14.9	13.8	7.3	73	16				90	120	30	
	1022	09/13	0.7				6.8	13.4	12.1	9.4	89	13				90	80	13	
	1140	09/27	0.6				6.8	11.7	9.9	9.5	92	14				92	55	32	
	1259	10/12	0.5				6.9	13.4	11.3	11.2	87	5				92	18	7	
	1290	10/25	0.4				6.9	10.5	8.3	11.2	90	6				90	17	2	
	1365	11/08	0.3	27	13.9	14.9	6.8	8.8	7.2	12.9	93	2	57	36	0.12	77	24	6	
	1430	11/22	0.3				6.8	7.6	5.6	12.8	95	3				70	28	20	
	1507	12/06	0.4				6.5	5.0	3.0	11.7	87	3				52	40	24	
	1562	12/20	0.3				6.7	6.0	4.0	12.8	90	1				70	31	18	
AVG.			0.7	21	14.8	15.0	6.73	9.68	7.90	11.0	89	8	61	44	0.20	77	63	23	
MAX.			4.5	28	19.5	20.3	6.9	17.2	15.3	14.1	99	18	78	55	0.47	110	300	120	
MIN.			0.3	10	13.2	12.9	6.4	4.2	2.5	6.6	68	0	52	36	0.08	52	1	0	

(212-X) HOP BROOK @ MOUTH

	SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. TOTAL	COLIFORM COLONIES PER 100 ML. FECAL	ELEV. GAGE
	6	01/04	0.4				6.8	6.6	4.6	14.1	96	0				60	9	4	
	44	01/19	0.3				6.9	7.6	5.7	13.0	89	0				67	3	1	
	79	02/01	0.3				6.9	7.7	5.8	14.0	96	0				65	2	2	
	114	02/16	0.3	10	12.3	15.1	6.9	8.4	6.3	14.4	98	0	49	40	0.06	68	1	1	
	273	04/12	0.3				6.5	4.6	2.7	13.3	99	3				50	6	5	
	316	04/26	0.3				6.9	6.0	4.0	11.2	97	9				62	12	7	
	353	05/10	0.3	18	12.0	11.8	6.9	8.1	6.4	10.4	94	11	53	40	0.08	63	11	11	
	385	05/24	0.3				6.9	8.8	7.1	10.2	90	10				65	24	14	
REVET	515	06/07	0.3		11.9	14.1	6.8	8.9	7.5	11.0	95	9				65	6	4	
	646	06/21	0.4				7.0	11.8	10.3	9.1	90	15				82	50	20	
	677	07/06	0.3				6.9	13.4	12.0	8.8	89	16				82	80	6	
	800	07/19	0.3				7.0	13.4	11.4	8.4	85	16				65	220	50	
	831	08/02	0.3				6.9	11.7	10.3	8.7	91	18				95	140	10	
	959	08/16	0.2	15	14.6	18.1	7.0	13.9	12.5	8.4	87	17	67	51	0.06	90	30	2	
	992	08/30	0.2				6.7	13.6	12.6	8.7	88	16				80	20	2	
	1023	09/13	0.2				6.9	13.1	12.0	9.7	92	13				82	10	4	
	1141	09/27	0.4				6.8	12.0	10.1	9.5	92	14				90	60	34	
	1260	10/12	0.3				7.1	13.0	11.3	11.8	91	4				88	11	3	
	1291	10/25	0.3				7.1	10.6	8.5	12.0	96	6				87	14	10	
	1366	11/08	0.3	25	12.7	15.7	7.0	8.8	7.1	13.4	97	2	56	38	0.10	73	15	0	
	1431	11/22	0.3				6.9	7.7	5.9	13.0	94	2				68	25	9	
	1508	12/06	0.4				6.6	4.5	2.5	11.8	88	3				50	39	34	
	1563	12/20	0.3				6.8	6.1	4.2	12.8	90	1				67	28	25	
AVG.			0.3	17	12.7	15.0	6.88	9.58	7.86	11.2	92	8	56	42	0.08	72	35	11	
MAX.			0.4	25	14.6	18.1	7.1	13.9	12.6	14.4	99	18	67	51	0.10	95	220	50	
MIN.			0.2	10	11.9	11.8	6.5	4.5	2.5	8.4	85	0	49	38	0.06	50	1	0	

(212) HOP BROOK-GATE #22

DATE SAMP	KJELDAHL -N	AMMONIA -N	NIT-RITE -N	NIT-RATE -N	ORTHO PHOS-PHORUS	TOTAL PHOS-PHORUS	ALUM-INUM	CAD-MIUM	COP-PER	NICKEL	LEAD	ZINC	IRON	CAL-CIUM	ARSENIC	MERCURY	CHRO-MIUM	MANG-ANESE
06/07	0.60	<0.05	<0.01	0.17	<0.01	0.25	0.102	<0.004	0.007	<0.03	<0.001	0.028	0.217	3.85	<0.004	<0.0002	<0.009	0.016

(212-X) HOP BROOK @ MOUTH

06/07	0.88	<0.05	<0.01	0.18	<0.01	0.28	0.069	<0.004	0.003	<0.03	<0.001	0.008	0.159	3.87	<0.004	<0.0002	<0.009	0.009

QUABBIN LABORATORY RECORDS 1993
(215) EAST BR. OF FEVER BROOK--ON WEST RD.

SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL	ELEV. GAGE
7	01/04	0.4				5.7	3.4	1.6	12.1	85	1				68	1	0	1.94
45	01/19	0.4				5.7	3.0	1.0	11.7	80	0				67	2	0	1.84
80	02/01	0.4				5.8	3.2	1.1	12.6	86	0				70	1	1	
115	02/16	0.5	47	18.7	13.3	6.0	4.1	2.2	12.0	82	0	64	49	0.28	80	13	8	1.74
163	03/01	0.6				6.0	5.1	2.8	11.6	79	0				82	0	0	
196	03/16	0.6				5.9	5.7	4.1	10.9	75	0				82	10	1	
231	03/29	0.6				5.7	3.2	1.1	12.4	85	0				80	30	9	2.48
274	04/12	0.3				5.5	2.2	0.6	11.5	88	4				42	2	0	2.40
317	04/26	0.4				5.7	2.8	1.0	8.8	85	14				70	2	0	1.98
354	05/10	0.5	50	16.5	10.0	6.0	3.6	1.7	7.2	77	19	58	37	0.32	70	0	0	1.61
386	05/24	0.6				6.0	3.3	1.6	7.0	70	16				80	1	0	1.78
REVET 516	06/07	0.5		21.3	11.2	5.9	3.0	1.4	8.1	78	14				82	8	5	1.81
647	06/21	0.7				5.9	5.0	3.6	5.1	54	18				82	140	58	
678	07/06	0.7				5.8	4.8	3.2	4.9	52	19				80	80	22	
832	08/02	0.6				5.6	3.4	2.0	5.5	63	23				75	30	0	
960	08/16	0.8	70	17.0	12.2	5.7	3.9	2.4	3.4	37	20	68	36	0.90	70	30	16	
993	08/30	1.3				5.4	4.7	3.5	2.5	27	19				70	65	43	
1024	09/13	0.8				5.5	4.1	2.8	4.7	48	17				67	50	20	
1142	09/27	0.6				5.8	4.7	3.1	6.6	65	15				67	200	100	
1261	10/12	0.5				5.7	5.3	3.4	5.1	42	7				73	4	3	
1292	10/25	0.5				5.9	4.4	2.5	8.6	71	7				88	10	5	
1367	11/08	0.3	50	19.5	11.4	5.8	3.1	1.0	10.3	79	4	60	32	0.18	78	11	1	
1432	11/22	0.3				5.7	3.4	1.3	11.6	86	3				73	9	1	
1509	12/06	0.4				5.5	2.5	0.6	10.8	80	3				68	18	12	
1564	12/20	0.4				5.5	3.0	1.1	10.6	77	2				68	10	0	2.70
AVG.		0.5	54	18.6	11.6	5.75	3.80	2.03	8.6	70	9	63	39	0.42	73	29	12	
MAX.		1.3	70	21.3	13.3	6.0	5.7	4.1	12.6	88	23	68	49	0.90	88	200	100	
MIN.		0.3	47	16.5	10.0	5.4	2.2	0.6	2.5	27	0	58	32	0.18	42	0	0	

QUABBIN LABORATORY RECORDS 1993

(215) EAST BR. OF FEVER BROOK--ON WEST RD. REVET ANALYSIS

DATE SAMP	KJELDAHL -N	AMMONIA -N	NIT-RITE -N	NIT-RATE -N	ORTHO PHOS-PHORUS	TOTAL PHOS-PHORUS	ALUM-INUM	CAD-MIUM	COP-PER	NICKEL	LEAD	ZINC	IRON	CAL-CIUM	ARSENIC	MERCURY	CHRO-MIUM	MANG-ANESE
06/07	0.39	<0.05	<0.01	<0.1	<0.01	0.05	0.088	0.007	<0.003	<0.03	<0.001	0.008	0.428	2.34	<0.004	<0.0002	<0.009	0.046

QUABBIN LABORATORY RECORDS 1993

(215A) WEST BR. OF FEVER BROOK—WOMENS FED.

	SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL	ELEV. GAGE
	8	01/04	0.4				6.1	4.6	2.4	11.6	79	0				62	7	4	
	46	01/19	0.4				6.1	5.0	3.2	12.2	83	0				62	1	1	
	81	02/01	0.4				6.1	5.0	3.3	12.6	86	0				67	0	0	
	116	02/16	0.5	40	15.0	12.9	6.3	6.9	5.0	12.7	87	0	60	44	0.20	72	1	0	
	164	03/01	0.6				6.2	6.9	4.7	12.2	83	0				73	0	0	
	275	04/12	0.3				5.8	3.2	1.1	13.1	95	2				48	1	0	
	318	04/26	0.4				6.2	4.1	2.1	9.0	85	13				55	11	7	
	355	05/10	0.6	65	14.8	9.9	6.3	5.2	3.3	7.2	76	18	59	36	0.32	63	2	2	
	387	05/24	0.7				6.3	5.7	4.0	6.6	66	16				67	50	41	
REVET	517	06/07	0.6		14.7	10.7	6.2	5.2	3.8	8.3	80	14				65	10	7	
	648	06/21	0.7				6.2	6.9	5.3	6.2	68	20				72	260	7	
	679	07/06	1.0				6.3	8.1	6.4	5.2	57	20				70	21	4	
	802	07/19	1.3				6.5	9.3	7.2	6.0	62	17				68	60	9	
	833	08/02	0.6				6.1	5.9	4.6	6.0	68	22				68	50	10	
	961	08/16	0.8	55	14.2	13.2	6.1	5.8	4.5	6.2	68	20	68	38	0.43	72	25	2	
	994	08/30	0.8				5.7	6.2	5.3	5.0	54	19				72	10	1	
	1025	09/13	0.6				6.1	6.9	5.7	6.9	69	16				70	30	1	
	1143	09/27	0.5				6.1	6.7	5.0	7.8	75	14				72	45	18	
	1262	10/12	0.5				6.2	6.6	4.6	8.6	73	8				78	11	9	
	1293	10/25	0.5				6.1	5.8	3.8	9.8	81	7				80	22	8	
	1368	11/08	0.4	75	18.2	14.9	6.1	5.5	3.6	10.9	84	4	70	37	0.23	80	26	6	
	1433	11/22	0.4				6.1	4.4	2.6	12.1	87	2				78	11	2	
	1510	12/06	0.4				5.7	2.9	0.8	11.3	82	2				58	22	15	
	1565	12/20	0.3				6.0	3.5	1.5	12.2	86	1				67	13	0	
AVG.			0.6	59	15.4	12.3	6.12	5.68	3.91	9.2	76	10	64	39	0.30	68	29	6	
MAX.			1.3	75	18.2	14.9	6.5	9.3	7.2	13.1	95	22	70	44	0.43	80	260	41	
MIN.			0.3	40	14.2	9.9	5.7	2.9	0.8	5.0	54	0	59	36	0.20	48	0	0	

QUABBIN LABORATORY RECORDS 1993

(215A) WEST BR. OF FEVER BROOK--WOMENS FED. REVET ANALYSIS

DATE SAMP	KJELDAHL -N	AMMONIA -N	NIT-RITE -N	NIT-RATE -N	ORTHO PHOS-PHORUS	TOTAL PHOS-PHORUS	ALUM-INUM	CAD-MIUM	COP-PER	NICKEL	LEAD	ZINC	IRON	CAL-CIUM	ARSENIC	MERCURY	CHRO-MIUM	MANG-ANESE
06/07	1.30	<0.05	<0.01	<0.1	<0.01	0.05	0.100	<0.004	<0.003	<0.03	<0.001	0.007	0.351	2.75	<0.004	<0.0002	<0.009	0.041

QUABBIN LABORATORY RECORDS 1993
(216B) RAND BROOK--RT.32A

	SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. TOTAL	COLIFORM COLONIES PER 100 ML. M.P. FECAL	ELEV. GAGE
	9	01/04	0.5				6.7	6.7	4.7	13.8	94	0				48	8	7	
	47	01/19	0.5				6.8	7.6	5.9	13.8	94	0				52	5	2	
	82	02/01	0.5				6.8	7.6	5.8	14.2	97	0				50	7	1	
	117	02/16	0.6	32	7.2	15.5	6.8	9.6	7.8	14.3	98	0	51	34	0.22	58	11	7	
	165	03/01	0.6				6.9	10.3	8.0	12.8	88	0				60	7	4	
	200	03/16	0.6				6.8	9.7	8.2	13.9	98	1				62	22	12	
	232	03/29	2.0				6.5	5.7	4.0	13.6	93	0				42	120	110	
	239	03/30	1.3							14.0	96	0				33	40	20	
	262	04/06	0.5							13.2	93	1				42	21	11	
	276	04/12	0.3				6.5	4.5	2.6	12.7	97	4				38	12	7	
	280	04/13	0.4							12.8	98	4				40	10	2	
	305	04/21	0.4							10.8	95	10				45	8	3	
	319	04/26	0.5				6.8	6.4	4.4	10.6	96	11				48	12	8	
	323	04/27	0.6							11.2	95	8				45	16	15	
	356	05/10	0.8	47	7.6	12.4	6.8	8.1	6.3	10.2	100	15	49	30	0.30	50	40	36	
	388	05/24	0.7				6.9	9.6	8.0	9.5	88	12				52	30	25	
REVET	518	06/07	0.7		8.9	13.4	6.9	9.8	8.4	10.2	94	12				53	40	12	
	649	06/21	1.0				7.0	12.0	10.7	8.9	93	18				63	90	34	
	680	07/06	1.3				7.0	13.6	12.2	8.2	91	21				65	100	12	
	803	07/19	1.2				7.2	15.1	13.3	7.5	80	19				72	50	6	
	834	08/02	0.9				7.0	13.7	12.0	7.8	88	22				70	130	10	
	962	08/16	0.8	37	10.6	16.3	7.1	14.4	12.9	8.4	92	20	61	35	0.40	70	50	12	
	995	08/30	0.9				6.8	14.8	13.7	8.2	88	19				77	100	2	
	1026	09/13	0.9				6.8	14.2	13.1	8.7	86	15				70	70	6	
	1144	09/27	0.9				6.8	13.6	11.7	8.8	87	15				62	40	14	
	1263	10/12	0.8				7.0	13.7	11.7	11.0	91	7				67	55	42	
	1294	10/25	0.6				7.0	10.6	8.6	11.3	93	7				68	7	0	
	1369	11/08	0.4	50	8.1	15.9	6.9	8.8	7.0	12.8	95	3	62	35	0.17	73	20	3	
	1434	11/22	0.4				6.8	8.1	6.2	12.8	93	2				70	18	3	
	1511	12/06	0.5				6.6	5.9	4.1	12.1	90	3				57	28	17	
	1566	12/20	0.3				6.6	6.3	4.6	13.0	91	1				55	20	4	
AVG.			0.7	42	8.5	14.7	6.84	10.02	8.30	11.3	93	8	56	34	0.27	57	38	14	
MAX.			2.0	50	10.6	16.3	7.2	15.1	13.7	14.3	100	22	62	35	0.40	77	130	110	
MIN.			0.3	32	7.2	12.4	6.5	4.5	2.6	7.5	80	0	49	30	0.17	33	5	0	

UPPER SUB.TRIB OF SITE (216B) @ DANA RD.

	238	03/30	0.9							12.6	91	2				65	70	32	
AVG.																			
MAX.																			
MIN.																			

(216B-3)TRIB. OF SITE 216B @ INTERSECTION OF DANA AND OLD DANA RD.

	265	04/06	0.4							11.6	84	2				70	2	1	
	283	04/13	0.4							10.6	81	4				63	1	0	
	308	04/21	0.5							7.6	70	12				78	1	0	
	326	04/27	0.5							8.5	75	10				75	8	5	
AVG.			0.5							9.6	78	7				72	3	2	
MAX.			0.5							11.6	84	12				78	8	5	
MIN.			0.4							7.6	70	2				63	1	0	

QUABBIN LABORATORY RECORDS 1993
(216B) RAND BROOK--RT.32A

REVET ANALYSIS

DATE SAMP	KJELDAHL -N	AMMONIA -N	NIT-RITE -N	NIT-RATE -N	ORTHO PHOS-PHORUS	TOTAL PHOS-PHORUS	ALUM-INUM	CAD-MIUM	COP-PER	NICKEL	LEAD	ZINC	IRON	CAL-CIUM	ARSENIC	MERCURY	CHRO-MIUM	MANG-ANESE
06/07	0.62	<0.05	<0.01	0.20	<0.01	0.10	0.103	<0.004	<0.003	<0.03	<0.001	0.008	0.467	3.82	<0.004	<0.0002	<0.009	0.079

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NO DATA

QUABBIN LABORATORY RECORDS 1993

(216B-1)NORTH BRANCH ABOVE SITE 216B RAND BK. @ RACOON HILL RD.

SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL	ELEV. GAGE
197	03/16	0.8							13.8	94	0				88	TNTC	200	
236	03/30	1.3							13.6	93	0				60	80	10	
263	04/06	0.4							12.8	93	2				78	50	40	
281	04/13	0.4							12.2	94	4				68	27	13	
306	04/21	0.4							10.4	94	11				78	100	85	
324	04/27	0.5							10.6	94	10				78	29	26	
357	05/10															12	10	
389	05/24															30	16	
519	06/07															100	9	
681	07/06															300	90	
835	08/02															180	20	
963	08/16								7.9	88	21					250	9	
996	08/30															130	22	
1145	09/27															22	15	
1264	10/12															55	32	
1295	10/25															120	80	
1370	11/08															55	8	
1435	11/22															100	68	
1512	12/06															250	110	
1567	12/20															200	140	
AVG.		0.6							11.6	93	7				75	131	50	
MAX.		1.3							13.8	94	21				88	TNTC	200	
MIN.		0.4							7.9	88	0				60	12	8	

3/16 FECAL COLIFORM result (with the approx. average increase of 260%) was used for TOTAL COLIFORM result in place of TNTC when calculating AVG.

(216B-2)SOUTH BRANCH ABOVE SITE 216B RAND BK. OFF RACOON HILL RD.

198	03/16	0.8							13.8	94	0				57	2	2	
237	03/30	1.0							13.8	94	0				30	33	25	
264	04/06	0.4							13.0	91	1				37	2	1	
282	04/13	0.4							12.8	95	3				32	3	1	
307	04/21	0.4							10.6	96	11				38	0	0	
325	04/27	0.5							11.0	95	9				40	7	7	
358	05/10															2	1	
390	05/24															2	2	
520	06/07															10	6	
682	07/06															60	42	
836	08/02															150	30	
964	08/16								8.4	87	17					90	11	
997	08/30															150	18	
1146	09/27															26	14	
1265	10/12															3	0	
1296	10/25															5	1	
1371	11/08															12	0	
1436	11/22															23	13	
1513	12/06															14	11	
1568	12/20															4	1	
AVG.		0.6							11.9	93	6				39	30	9	
MAX.		1.0							13.8	96	17				57	150	42	
MIN.		0.4							8.4	87	0				30	0	0	

QUABBIN LABORATORY RECORDS 1993

(211A) ATHERTON BROOK AT RT. #202

SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. TOTAL	COLIFORM COLONIES PER 100 ML. FECAL	M.P. ELEV. GAGE
10	01/04	0.2				5.9	2.8	1.1	13.5	95	1				37	6	1	
48	01/19	0.2				6.0	2.8	0.8	13.3	91	0				38	1	0	
83	02/01	0.2				6.1	3.0	1.1	14.0	96	0				35	1	0	
118	02/16	0.2	10	5.0	8.3	6.3	4.1	2.2	13.9	95	0	34	25	0.04	37	1	0	
166	03/01	0.3				6.3	3.9	1.8	12.6	89	1				38	0	0	
201	03/16	0.2				6.3	3.9	2.3	14.1	96	0				38	0	0	
233	03/29	1.5				5.5	2.4	0.3	13.6	93	0				40	20	2	
277	04/12	0.2				5.2	1.8	-0.1	13.3	99	3				32	1	0	
320	04/26	0.2				5.7	2.3	0.6	11.0	95	9				35	2	0	
359	05/10	0.2	17	6.7	7.9	6.0	2.8	1.0	10.5	93	10	39	27	0.05	37	5	1	
391	05/24	0.2				6.2	3.4	1.5	10.2	90	10				35	2	0	
REVET 521	06/07	0.2		8.1	8.8	6.2	3.5	1.9	10.7	93	9				38	3	4	
650	06/21	0.2				6.4	4.7	3.2	8.9	88	15				33	26	22	
683	07/06	0.3				6.5	6.4	5.1	8.4	85	16				32	5	4	
804	07/19	0.3				6.6	7.2	5.6	7.8	78	16				32	10	4	
837	08/02	0.2				6.4	5.3	3.9	8.2	84	17				37	30	10	
965	08/16	0.2	22	5.4	10.7	6.5	6.6	5.3	8.5	88	17	42	26	0.07	33	60	27	
998	08/30	0.2				6.2	6.2	5.3	6.9	69	16				33	10	3	
1027	09/13	0.2				6.4	5.6	4.6	9.3	86	12				38	50	38	
1147	09/27	0.2				6.4	4.8	3.2	8.9	84	13				47	45	26	
1266	10/12	0.2				6.5	5.7	3.9	11.2	86	4				42	4	2	
1297	10/25	0.2				6.2	3.9	2.0	11.0	91	7				52	1	0	
1372	11/08	0.2	30	9.9	10.1	5.9	2.9	0.8	12.8	93	2	43	27	0.07	50	3	0	
1437	11/22	0.2				5.8	2.4	0.4	12.2	91	3				48	11	9	
1514	12/06	0.3				5.2	2.0	0.0	12.0	92	4				40	4	0	
1569	12/20	0.3				5.7	2.5	0.6	12.6	89	1				40	1	0	
AVG.		0.3	20	7.0	9.2	6.09	3.96	2.25	11.1	89	7	40	26	0.06	38	12	6	
MAX.		1.5	30	9.9	10.7	6.6	7.2	5.6	14.1	99	17	43	27	0.07	52	60	38	
MIN.		0.2	10	5.0	7.9	5.2	1.8	-0.1	6.9	69	0	34	25	0.04	32	0	0	

(XXX) SMALL TRIB. ON RT.122 PETERSHAM-EAST OF GRANGE

838	08/02															250	110	
1148	09/27															120	41	
1298	10/25															13	8	
1373	11/08															45	34	
1438	11/22															18	10	
1515	12/06															TNTC	80	
1570	12/20															28	8	
AVG.																93	42	
MAX.																TNTC	110	
MIN.																13	8	

12/6 FECAL COLIFORM result(with the approx. average increase of 225%)was used for TOTAL COLIFORM result in place of TNTC when calculating AVG.

QUABBIN LABORATORY RECORDS 1993

(211A) ATHERTON BROOK AT RT. #202 REVET ANALYSIS

DATE SAMP	KJELDAHL -N	AMMONIA -N	NIT-RITE -N	NIT-RATE -N	ORTHO PHOS-PHORUS	TOTAL PHOS-PHORUS	ALUM-INUM	CAD-MIUM	COP-PER	NICKEL	LEAD	ZINC	IRON	CAL-CIUM	ARSENIC	MERCURY	CHRO-MIUM	MANG-ANESE
06/21	0.18	<0.05	<0.01	<0.1	<0.01	0.24	0.141	<0.004	<0.003	<0.03	<0.001	0.008	0.080	1.88	<0.004	<0.0002	<0.009	0.005

QUABBIN LABORATORY RECORDS 1993

M.D.C. DRINKING WATER--@ LAB TAP

SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL
123	02/16															0	0
147	02/26															0	0
526	06/09															0	0

M.D.C. DRINKING WATER--@ VISITOR CENTER FOUNTAIN

122	02/16															0	0
148	02/26															0	0
525	06/09															0	0

M.D.C. DRINKING WATER--@ MAIN OFFICE FOUNTAIN

121	02/16															0	0
156	02/26															0	0
524	06/09															0	0

M.D.C. DRINKING WATER--@ RESIDENCE #2

	03/23																

M.D.C. DRINKING WATER--@ GARAGE TAP

124	02/16															0	0
152	02/26															0	0
527	06/09															0	0

M.D.C. DRINKING WATER--@ EAST WING, FIRST FLOOR

149	02/26															0	0

M.D.C. DRINKING WATER--@ EAST WING, SECOND FLOOR

SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL
150	02/26															0	0

QUABBIN LABORATORY RECORDS 1993
M.D.C. DRINKING WATER REVET ANALYSIS

M.D.C. DRINKING WATER--@ RESIDENCE #2

DATE SAMP	KJELDAHL -N	AMMONIA -N	NIT-RITE -N	NIT-RATE -N	ORTHO PHOS-PHORUS	TOTAL PHOS-PHORUS	ALUM-INUM	CAD-MIUM	COP-PER	NICKEL	LEAD	ZINC	IRON	CAL-CIUM	ARSENIC	MERCURY	CHRO-MIUM	MANG-ANESE
03/23 KITCHEN-FIRST				0.003														
" KITCHEN-30 SECONDS				<0.001														
" KITCHEN-5 MINUTES				<0.001														
" DOWNSTAIRS BATH-FIRST				0.001														
" DOWNSTAIRS BATH-30 SECONDS				<0.001														
" UPSTAIRS BATH-FIRST				<0.001														
" UPSTAIRS BATH-30 SECONDS				0.001														

QUABBIN LABORATORY RECORDS 1993

M.D C. DRINKING WATER--@ THIRD FLOOR CONF. ROOM

SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	%SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	FECAL
153	02/26															0	0

M.D.C. DRINKING WATER--@ REC. ROOM

151	02/26															0	0

M.D.C. DRINKING WATER--@ ENGINEERING TAP

154	02/26															0	0

M.D.C. DRINKING WATER--@ POLICE TAP

155	02/26															0	0

QUABBIN LABORATORY RECORDS 1993---SPECIAL SAMPLES--DEER HUNT
PRESCOTT, HARDWICK, NEW SALEM, and PELHAM BLOCKS.

(Pre Deer Hunt)

PRESCOTT BLOCK

SAMPLE SITE	DATE SAMP	TURB-IDITY	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	FECAL
(211) WEST BR. SWIFT--RT.202	11/02	0.4	12	4
DICKY BROOK - @ GATE #17 RD.	"	0.6*	13	8
DICKY BROOK - @ STONE BRIDGE	"	0.3	17	7
THURSTON BROOK	"	0.6*	8	4
PRESCOTT BROOK	"	0.3	7	2
UNDERHILL BROOK	"	0.3	11	1
EGYPT BROOK	"	0.2	13	5

* Much sediment in sample.

(During Deer Hunt)

SAMPLE SITE	DATE SAMP	TURB-IDITY	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	FECAL
(211) WEST BR. SWIFT--RT.202	11/08	0.2	26	0
DICKY BROOK - @ GATE #17 RD.	"	0.3	15	2
DICKY BROOK - @ STONE BRIDGE	"	0.3	13	1
THURSTON BROOK	"	0.2	15	0
PRESCOTT BROOK	"	0.3	12	1
UNDERHILL BROOK	"	0.2	8	2
EGYPT BROOK	"	0.2	9	0
(211) WEST BR. SWIFT--RT.202	11/09	0.2	4	2
DICKY BROOK - @ GATE #17 RD.	"	0.3	9	0
DICKY BROOK - @ STONE BRIDGE	"	0.3	9	1
THURSTON BROOK	"	0.3	11	1
PRESCOTT BROOK	"	0.3	14	0
UNDERHILL BROOK	"	0.2	11	2
EGYPT BROOK	"	0.2	4	0
(211) WEST BR. SWIFT--RT.202	11/15	0.2	4	0
DICKY BROOK - @ GATE #17 RD.	"	0.3	30	20
DICKY BROOK - @ STONE BRIDGE	"	0.3	10	5
THURSTON BROOK	"	0.3	12	1
PRESCOTT BROOK	"	0.3	12	0
UNDERHILL BROOK	"	0.3	10	7
EGYPT BROOK	"	0.2	2	0
(211) WEST BR. SWIFT--RT.202	11/16	0.2	13	4
DICKY BROOK - @ GATE #17 RD.	"	0.3	20	12
DICKY BROOK - @ STONE BRIDGE	"	0.3	12	2
THURSTON BROOK	"	0.3	25	2
PRESCOTT BROOK	"	0.3	13	0
UNDERHILL BROOK	"	0.3	9	2
EGYPT BROOK	"	0.2	4	2

CONTINUED NEXT COLUMN

HARDWICK BLOCK

SAMPLE SITE	DATE SAMP	TURB-IDITY	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	FECAL
SUNK BROOK (Q30) H-1	11/29	0.50	40	31
(Q28) H-2	"	0.40	51	39
(Q27) H-3	"	0.60	26	11
SUNK BROOK (Q30) H-1	11/30	0.40	23	19
(Q28) H-2	"	0.40	15	13
(Q27) H-3	"	0.50	33	7
SUNK BROOK (Q30) H-1	12/01	0.35	16	12
(Q28) H-2	"	0.30	12	12
(Q27) H-3	"	0.45	32	26
SUNK BROOK (Q30) H-1	12/02	0.30	20	7
(Q28) H-2	"	0.25	14	4
(Q27) H-3	"	0.45	14	10

NEW SALEM BLOCK

SAMPLE SITE	SAMP	DATE SAMP	TURB-IDITY	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	FECAL
212-X HOP BK. @ MOUTH	NS-1	11/29	0.60	60	50
	NS-2	"	0.25	37	23
GILES BK. @ ROAD	NS-3	"	0.20	22	6
MOOSEHORN BK @ CULVERT	NS-4	"	0.50	52	36
212-X HOP BK. @ MOUTH	NS-1	11/30	0.40	18	25
	NS-2	"	0.30	18	13
GILES BK. @ ROAD	NS-3	"	0.20	15	4
MOOSEHORN BK @ CULVERT	NS-4	"	0.40	20	9
212-X HOP BK. @ MOUTH	NS-1	12/01	0.30	18	6
	NS-2	"	0.20	12	5
GILES BK. @ ROAD	NS-3	"	0.20	3	1
MOOSEHORN BK @ CULVERT	NS-4	"	0.30	15	3
212-X HOP BK. @ MOUTH	NS-1	12/02	0.30	8	5
	NS-2	"	0.20	5	1
GILES BK. @ ROAD	NS-3	"	0.25	6	0
MOOSEHORN BK @ CULVERT	NS-4	"	0.35	11	5

Report on Cadwell Creek -- Data collected by Lab Interns.

	DATE	SITE #1	SITE #2	SITE #3	SITE #4	SITE #5	SITE #6	SITE #7	SITE #8	SITE #9	SITE #10
TEMP. (DEG. C.)	06/09/93	13	13	13	14	15	17	16	13	13	13
	06/16/93	15	15	14	16	17	17	18	15	15	15
	06/23/93	14	14	14	15	16	16	17	17	15	15
	06/30/93	16	*	15	17	17	17	19	18	16	16
	07/07/93	19	*	18	22	21	20	22	19	18	*
	07/12/93	17	*	16	18	17	18	19	16	17	*
	07/27/93	15	*	15	*	15	*	16	15	15	*
	08/05/93	17	*	16	*	17	*	18	*	18	*
	08/12/93	16	*	16	*	*	*	18	*	16	*
	09/30/93	9	*	9	9	9	10	10	11	10	10
	10/07/93	9	*	9	10	10	10	10	11	10	10
	10/14/93	4	*	4	5	5	6	7	6	6	6
	10/21/93	8	8	8	9	9	9	9	9	9	9
	10/28/93	7	*	7	7	7	8	8	8	8	8
	11/04/93	4	4	4	5	5	6	5	6	6	6
	11/09/93	2	2	2	2	3	4	3	4	4	4
	11/18/93	6	6	6	7	7	7	6	7	7	7
	11/23/93	3	4	3	4	5	5	5	5	5	5
	12/02/93	2	2	2	2	3	2	2	3	3	3
	12/09/93	3	3	3	3	3	3	2	4	4	4
	12/16/93	5	5	5	5	5	5	5	5	5	5
	12/23/93	1	1	1	1	2	2	1	3	3	3
D.O. (PPM)	06/09/93	10.2	9.3	9.7	12.3	11.1	10.0	9.4	9.8	10.8	11.0
	06/16/93	10.5	8.7	9.6	10.2	8.4	8.0	7.2	8.9	8.6	8.4
	06/23/93	9.4	6.7	8.9	9.3	7.8	7.4	7.6	8.4	8.0	6.9
	06/30/93	8.0	*	8.5	8.7	6.9	7.4	6.5	6.4	8.4	7.0
	07/07/93	8.8	*	8.1	7.7	5.8	6.5	5.8	7.9	6.9	*
	07/12/93	9.3	*	8.8	7.2	6.7	6.5	7.8	7.8	6.9	*
	07/27/93	9.8	*	9.6	*	6.8	*	7.6	10.1	7.1	*
	08/05/93	7.9	*	6.4	*	6.5	*	7.0	*	6.4	*
	08/12/93	8.9	*	8.6	*	*	*	6.0	*	6.3	*
	09/30/93	10.2	*	10.4	11.0	10.0	9.8	10.5	9.8	9.8	9.6
	10/07/93	11.0	*	11.0	10.4	9.4	10.2	10.0	8.8	9.4	9.8
	10/14/93	12.6	*	13.0	13.0	12.0	11.8	11.6	11.6	11.6	11.8
	10/21/93	11.2	9.0	10.6	11.0	10.8	10.8	11.0	11.0	11.0	11.0
	10/28/93	9.8	*	10.0	10.6	9.8	10.4	10.6	10.2	10.2	10.2
	11/04/93	12.4	12.0	12.4	12.4	12.2	12.0	12.4	11.8	12.2	12.0
	11/09/93	13.2	13.0	13.0	13.2	13.2	12.8	13.2	12.4	13.0	12.6
	11/18/93	12.4	12.2	12.8	12.4	12.8	13.0	13.2	12.6	12.2	12.0
	11/23/93	13.0	12.6	12.8	13.0	12.6	12.7	13.0	12.2	12.4	12.4
	12/02/93	13.0	12.6	12.8	12.6	12.2	12.8	13.2	11.8	12.0	11.8
	12/09/93	13.0	13.0	13.0	13.0	12.6	13.2	13.2	12.4	12.2	12.2
	12/16/93	12.6	12.4	12.4	12.6	12.2	12.4	-	12.2	12.2	12.0
	12/23/93	13.6	13.6	13.8	13.6	12.4	12.6	13.4	12.8	12.8	12.6

* NO FLOW - NO SAMPLE

CONTINUED NEXT PAGE

Report on Cadwell Creek -- Data collected by Lab Interns.

	DATE	SITE #1	SITE #2	SITE #3	SITE #4	SITE #5	SITE #6	SITE #7	SITE #8	SITE #9	SITE #10
D.O. (% SAT)	06/09/93	97	89	92	119	110	103	95	93	103	105
	06/16/93	104	86	93	103	87	83	76	88	85	83
	06/23/93	91	65	86	92	79	75	78	87	79	68
	06/30/93	81	*	84	90	71	76	70	67	85	71
	07/07/93	95	*	85	87	64	71	65	85	73	*
	07/12/93	96	*	89	76	69	68	84	79	71	*
	07/27/93	97	*	95	*	67	*	77	100	70	*
	08/05/93	81	*	89	*	67	*	74	*	67	*
	08/12/93	90	*	87	*	*	*	63	*	64	*
	09/30/93	88	*	90	95	87	87	93	89	87	85
	10/07/93	95	*	95	92	83	90	88	80	83	87
	10/14/93	97	*	100	102	94	95	96	93	93	95
	10/21/93	95	76	89	95	93	93	95	95	95	95
	10/28/93	81	*	82	87	81	88	89	86	86	86
	11/04/93	95	92	95	97	95	96	97	95	98	96
	11/09/93	95	94	94	95	98	98	98	95	100	97
	11/18/93	100	98	103	102	105	107	106	104	101	99
	11/23/93	97	97	95	100	98	99	102	95	97	97
	12/02/93	94	91	93	91	91	93	95	88	89	88
	12/09/93	97	97	97	97	94	98	95	95	94	94
	12/16/93	98	97	97	98	95	97	-	95	95	94
	12/23/93	96	96	97	96	90	91	94	95	95	94
COLIFORM TOTAL/FECAL PER 100 ml M.F.	06/09/93	16/9	TNTC/43	13/6	28/27	72/102	30/3	21/9	6/1	6/4	3/3
	06/16/93	110/82	200/40	126/66	36/27	120/80	73/46	128/46	65/89	60/60	30/20
	06/23/93	30/70	140/100	120/30	50/20	120/60	70/40	130/60	160/70	70/30	40/30
	06/30/93	50/10	*	0/0	30/20	130/30	100/30	300/120	60/60	60/20	40/0
	07/07/93	20/20	*	40/0	50/0	130/10	230/30	90/30	290/40	150/0	*
	07/12/93	70/20	*	80/20	180/60	1200/50	180/80	240/40	450/160	390/80	*
	07/27/93	600/280	*	400/190	*	5500/2770	*	1800/200	300/140	2100/250	*
	08/05/93	500/50	*	300/30	*	300/0	*	2000/0	*	300/240	*
	08/12/93	130/10	*	60/11	*	*	*	160/34	*	400/60	*
	09/30/93	45/26	*	55/29	89/18	39/30	50/38	57/19	31/7	27/4	49/13
	10/07/93	26/8	*	21/10	34/5	0/2929	24/2	21/5	20/4	13/7	30/13
	10/14/93	83/48	*	109/40	103/35	53/24	104/33	238/285	25/11	26/7	40/32
	10/21/93	222/170	70/422	127/87	153/121	126/107	81/30	820/56	135/51	117/50	164/70
	10/28/93	8/2	*	3/4	32/2	19/6	8/2	19/3	11/3	9/3	11/1
	11/04/93	41/7	97/13	60/7	72/1	62/0	23/1	38/1	42/3	42/3	13/2
	11/09/93	15/1	46/0	31/1	35/1	16/2	13/0	34/1	21/0	15/0	8/0
	11/18/93	109/24	86/22	111/13	86/18	73/4	37/23	114/20	33/3	40/3	22/1
	11/23/93	49/0	53/4	35/0	37/1	28/0	18/0	26/1	18/0	41/0	25/1
	12/02/93	51/8	49/1	57/10	58/6	49/40	21/1	33/2	28/1	51/0	13/0
	12/09/93	28/0	39/2	33/0	49/1	31/0	54/5	38/2	29/0	41/0	48/0
	12/16/93	50/1	50/0	54/3	53/2	65/0	74/1	67/4	62/0	57/0	29/1
	12/23/93	35/0	33/2	55/2	40/1	18/0	33/5	26/1	41/1	63/1	25/0

* NO FLOW - NO SAMPLE

10/7/93 Site #5 and 10/21/93 Site #2--Fecal Coliform plates covered with CONFLUENT COLONIES, considered Non Coliform, this makes the Fecal Coliform figures questionable for these dates.

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NO DATA

4.2 WARE RIVER WATERSHED TRIBUTARIES WATER QUALITY DATA

QUABBIN LABORATORY RECORDS 1993
WARE RIVER AND TRIBUTARIES
WARE RIVER--@ SHAFT #11A

SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL
253	04/05	0.5				5.8	2.9	1.0	13.6	93	0				52	3	0

WARE RIVER--@ SHAFT #8

SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL
25	01/11	0.5				6.0	3.7	1.5	14.3	98	0				52	1	1
62	01/25	0.5				6.2	4.0	2.2	13.7	94	0				52	2	2
97	02/08	0.4	37	13.0	12.8	6.3	4.8	2.7	14.5	99	0	50	32	0.18	63	1	0
135	02/22	0.5				6.2	5.4	3.6	13.6	93	0				68	2	1
180	03/08	0.5				6.2	4.8	3.6	14.4	98	0				67	2	0
214	03/22	0.4				6.2	5.0	3.2	13.3	91	0				70	5	0
252	04/05	0.4				5.8	2.4	0.4	13.7	94	0				53	2	0
296	04/20	0.3				5.9	2.9	1.2	11.8	102	9				50	2	2
339	05/03	0.7	60	11.6	10.6	6.3	4.1	2.1	9.3	90	14	50	29	0.33	55	6	3
371	05/17	1.3				6.4	5.6	4.1	11.1	114	17				63	11	12
REVET 501	06/01	1.3		13.9	10.9	6.4	6.1	4.5	10.5	101	14				63	55	45
537	06/14	1.4				6.5	6.6	5.1	9.5	105	21				65	35	20
663	06/28	1.5				6.6	7.3	5.6	8.9	101	22				68	10	0
696	07/12	1.7				6.3	6.0	4.4	6.9	81	24				62	80	20
817	07/26	2.0				6.7	7.9	6.4	9.0	98	20				67	40	20
851	08/09	1.7	65	14.0	10.5	6.6	7.1	5.4	8.1	90	21	62	36	1.00	65	70	50
978	08/23	1.3				6.4	5.8	4.1	8.5	93	20				62	60	35
1009	09/07	2.2				6.5	8.6	6.6	8.2	91	21				58	40	20
1128	09/20	2.5				6.5	7.6	5.7	9.0	87	14				73	20	0
1158	10/04	1.0				6.3	4.7	2.5	10.1	91	11				62	16	11
1277	10/18	0.8				6.3	5.4	3.4	11.4	101	10				62	17	11
1310	11/01	0.8	85	12.1	13.3	6.2	4.6	2.8	11.6	91	5	57	31	0.53	58	34	22
1407	11/15	0.7				6.3	4.7	2.6	12.2	101	7				65	15	1
1470	11/30	0.6				5.9	3.5	1.6	12.0	92	4				52	20	20
1539	12/13	0.4				5.8	2.8	0.8	12.6	86	0				50	3	2
1592	12/27	0.4				5.9	3.3	1.7	13.4	92	0				62	4	1
AVG.		1.0	62	12.9	11.6	6.26	5.18	3.38	11.2	95	10	55	32	0.51	61	21	12
MAX.		2.5	85	14.0	13.3	6.7	8.6	6.6	14.5	114	24	62	36	1.00	73	80	50
MIN.		0.3	37	11.6	10.5	5.8	2.4	0.4	6.9	81	0	50	29	0.18	50	1	0

QUABBIN LABORATORY RECORDS 1993
WARE RIVER AND TRIBUTARIES

WARE RIVER--@ SHAFT #8

DATE SAMP	KJELDAHL -N	AMMONIA -N	NIT-RITE -N	NIT-RATE -N	ORTHO PHOS-PHORUS	TOTAL PHOS-PHORUS	ALUM-INUM	CAD-MIUM	COP-PER	NICKEL	LEAD	ZINC	IRON	CAL-CIUM	ARSENIC	MERCURY	CHRO-MIUM	MANG-ANESE
06/01	2.74	<0.05	<0.01	<0.1	<0.01	0.45	0.091	<0.004	0.005	<0.03	0.002	0.004	0.778	3.00	<0.004	<0.0002	<0.009	0.039

QUABBIN LABORATORY RECORDS 1993
WARE RIVER AND TRIBUTARIES
(111)(B6) QUEEN LAKE—℄ ROAD CULVERT

	SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL
	16	01/11	0.3				6.7	6.7	4.9	12.8	90	1				48	1	0
	53	01/25	0.4				6.7	6.0	3.7	12.6	86	0				50	18	13
	89	02/08	0.4	8	8.5	11.5	6.8	7.1	5.2	12.2	88	2	35	21	0.03	50	8	9
	127	02/22	0.4				6.7	6.6	4.5	12.5	88	1				50	10	3
	172	03/08	0.3				6.5	6.3	5.0	13.3	99	3				50	3	0
	206	03/22	0.3				6.5	7.1	5.2	12.8	90	1				52	60	55
	243	04/05	0.5				6.5	5.3	3.1	12.5	90	2				42	7	5
	287	04/20	0.3				6.4	4.7	2.3	10.8	91	8				47	1	0
	330	05/03	0.4	8	7.8	13.6	6.6	5.7	3.7	9.7	90	12	36	26	0.06	47	50	46
	362	05/17	0.4				6.6	6.1	4.6			16				48	30	28
REVET	492	06/01	0.7		6.2	11.1	6.6	6.1	4.6	9.2	87	13				47	800	650
	528	06/14	0.5				6.6	6.9	5.3	8.6	89	17				52	25	10
	653	06/28	0.6				6.7	7.5	5.8	7.3	80	20				52	17	9
	686	07/12	0.6				6.7	7.3	5.6	7.0	79	22				52	TNTC	27
	841	08/09	0.9	18	6.6	9.5	6.7	7.0	5.1	8.2	88	19	48	23	0.47	52	400	280
	969	08/23	0.4				6.7	7.5	5.8	8.2	84	17				53	300	9
	1001	09/07	1.0				6.6	9.3	7.5	8.5	91	19				57	100	27
	1151	10/04	0.4				6.7	4.9	2.9	9.7	90	12				47	60	42
	1269	10/18	0.4				6.7	6.6	4.4	9.6	89	12				50	20	8
	1301	11/01	0.4	20	8.5	10.5	6.6	6.1	4.4	10.8	89	7	36	17	0.06	50	12	3
	1398	11/15	0.5				6.7	5.5	3.8	11.1	96	9				48	37	0
	1461	11/30	0.5				6.6	5.7	3.8	12.2	94	4				48	9	0
	1530	12/13	0.4				6.6	5.3	3.4	13.2	93	1				48	15	2
	1584	12/27	0.4				6.6	5.6	3.8	13.6	93	0				50	3	3
AVG.			0.5	14	7.5	11.2	6.63	6.37	4.52	10.7	89	9	39	22	0.16	50	85	51
MAX.			1.0	20	8.5	13.6	6.8	9.3	7.5	13.6	99	22	48	26	0.47	57	TNTC	650
MIN.			0.3	8	6.2	9.5	6.4	4.7	2.3	7.0	79	0	35	17	0.03	42	1	0

7/12 FECAL COLIFORM result(with the approx.average increase of 165%)was used for TOTAL COLIFORM result in place of TNTC when calculating AVG.

QUABBIN LABORATORY RECORDS 1993
WARE RIVER AND TRIBUTARIES
(111)(B6) QUEEN LAKE--@ OUTLET

REVET ANALYSIS

DATE SAMP	KJELDAHL -N	AMMONIA -N	NIT-RITE -N	NIT-RATE -N	ORTHO PHOS-PHORUS	TOTAL PHOS-PHORUS	ALUM-INUM	CAD-MIUM	COP-PER	NICKEL	LEAD	ZINC	IRON	CAL-CIUM	ARSENIC	MERCURY	CHRO-MIUM	MANG-ANESE
06/01	0.84	<0.05	<0.01	0.34	<0.01	0.09	0.119	<0.004	<0.003	<0.03	<0.001	0.009	0.281	3.06	<0.004	<0.0002	<0.009	0.088

QUABBIN LABORATORY RECORDS 1993
WARE RIVER AND TRIBUTARIES
(112)(B2) BURNSHIRT RIVER--@ WILLIAMSVILLE RD.

	SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL
	17	01/11	0.5				5.8	3.1	0.9	13.0	89	0				48	0	0
	54	01/25	0.5				6.0	3.5	1.6	13.0	89	0				48	11	6
	90	02/08	0.4	43	10.8	9.8	6.1	4.0	1.8	12.5	86	0	46	30	0.13	52	0	0
	128	02/22	0.4				6.2	4.3	2.6	12.6	86	0				60	3	2
	173	03/08	0.4				6.1	3.6	2.3	12.9	91	1				55	2	0
	207	03/22	0.4				6.1	4.3	2.1	12.6	89	1				62	0	0
	244	04/05	0.4				5.7	2.5	0.8	13.1	92	1				48	1	0
	288	04/20	0.3				5.7	2.9	1.0	10.6	92	9				40	1	0
	331	05/03	0.4	45	8.3	11.6	6.0	2.7	0.7	9.4	79	8	40	26	0.17	43	0	0
	363	05/17	0.7				6.1	3.3	1.4			16				43	2	1
REVET	493	06/01	0.6		9.7	10.7	6.1	3.1	1.2	9.0	85	13				42	200	130
	529	06/14	0.7				6.2	3.4	1.5	7.5	79	18				48	15	13
	654	06/28	1.2				6.2	3.9	2.1	7.1	80	22				48	40	30
	687	07/12	1.2				6.1	4.0	2.6	6.6	77	24				47	200	200
	808	07/26	1.5				6.3	4.6	2.6	7.1	77	20				45	50	40
	842	08/09	1.2	50	8.6	8.8	6.2	4.4	3.0	6.9	77	21	41	17	0.63	43	40	20
	970	08/23	0.8				6.2	4.9	3.3	7.4	78	18				42	70	50
	1002	09/07	1.2				6.1	5.5	3.8	7.0	76	20				42	30	21
	1121	09/20	1.3				6.2	4.9	3.3	8.5	77	11				43	50	9
	1152	10/04	0.8				6.3	4.9	3.2	9.1	80	10				43	7	4
	1270	10/18	0.7				6.4	4.9	2.8	9.4	85	11				47	7	6
	1302	11/01	0.5	65	11.0	11.1	6.1	4.0	1.9	11.0	91	7	53	25	0.37	50	10	8
	1399	11/15	0.4				6.0	3.9	1.6	11.3	93	7				50	13	0
	1462	11/30	0.4				5.8	3.1	0.9	12.0	92	4				47	15	8
	1531	12/13	0.3				5.7	2.4	0.2	13.6	93	0				42	17	2
	1585	12/27	0.3				5.7	2.4	0.4	13.4	92	0				50	5	1
AVG.			0.7	51	9.7	10.4	6.05	3.79	1.91	10.3	85	9	45	25	0.33	47	30	21
MAX.			1.5	65	11.0	11.6	6.4	5.5	3.8	13.6	93	24	53	30	0.63	62	200	200
MIN.			0.3	43	8.3	8.8	5.7	2.4	0.2	6.6	76	0	40	17	0.13	40	0	0

QUABBIN LABORATORY RECORDS 1993
WARE RIVER AND TRIBUTARIES
(112)(B2) BURNSHIRT RIVER--@ WILLIAMSVILLE RD. REVET ANALYSIS

DATE SAMP	KJELDAHL -N	AMMONIA -N	NIT-RITE -N	NIT-RATE -N	ORTHO PHOS-PHORUS	TOTAL PHOS-PHORUS	ALUM-INUM	CAD-MIUM	COP-PER	NICKEL	LEAD	ZINC	IRON	CAL-CIUM	ARSENIC	MERCURY	CHRO-MIUM	MANG-ANESE
06/01	0.81	<0.05	<0.01	<0.1	<0.01	0.07	0.142	<0.004	0.006	<0.03	0.001	0.004	0.379	1.75	<0.004	<0.0002	<0.009	0.025

QUABBIN LABORATORY RECORDS 1993
WARE RIVER AND TRIBUTARIES
(M1) MATTY POND BROOK--@ HALE RD.

	SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL
	18	01/11	0.5				5.6	3.6	1.8	8.3	57	0				58	1	1
	55	01/25	0.5				5.7	4.3	2.1	8.0	55	0				58	3	3
	91	02/08	0.6	50	12.1	12.5	5.8	5.8	3.5	6.7	46	0	57	35	0.45	67	0	0
	129	02/22	0.7				5.7	7.0	5.0	6.9	47	0				67	10	3
	174	03/08	0.7				5.6	6.5	5.1	8.2	56	0				70	10	0
	208	03/22	0.6				5.7	6.0	3.7	7.6	52	0				62	6	0
	245	04/05	0.4				5.5	3.3	1.1	9.2	63	0				53	1	0
	289	04/20	0.4				5.5	3.4	1.0	7.4	64	9				50	3	0
	332	05/03	0.5	85	12.2	11.7	5.8	4.3	2.6	5.1	48	13	50	27	0.48	52	5	2
	364	05/17	0.9				6.0	6.6	4.4			16				55	31	19
REVET	494	06/01	1.2		12.4	14.9	6.0	7.0	5.0	4.9	46	13				53	60	50
	530	06/14	1.4				6.1	9.9	7.8	3.5	37	18				60	40	30
	655	06/28	2.0				6.1	11.0	8.9	2.3	26	21				58	50	50
	688	07/12	2.8				5.9	11.2	8.9	1.1	12	22				58	250	70
	809	07/26	1.8				6.1	10.7	8.3	2.2	23	18				53	20	10
	843	08/09	2.5	200	9.7	12.9	6.1	10.5	8.5	2.2	24	20	87	34	3.20	53	30	20
	971	08/23	1.5				5.9	8.6	6.7	2.2	23	17				52	50	10
	1003	09/07	3.3				6.0	10.0	7.9	1.7	18	19				52	50	40
	1122	09/20	1.7				5.9	8.5	6.6	3.4	31	12				52	40	20
	1153	10/04	0.7				5.8	5.7	3.5	4.9	43	10				50	12	9
	1271	10/18	0.7				5.5	4.4	2.2	4.6	40	9				50	TNTC	150
	1303	11/01	0.8	130	12.2	12.4	5.7	3.6	1.6	7.3	57	5	58	24	0.80	53	14	9
	1400	11/15	0.6				5.7	3.7	1.6	7.8	64	7				58	10	2
	1463	11/30	0.5				5.6	3.8	1.9	8.6	62	2				52	11	8
	1532	12/13	0.4				5.5	3.6	1.7	10.0	68	0				53	2	0
	1586	12/27	0.4				5.6	3.7	1.7	8.6	59	0				60	4	0
AVG.			1.1	116	11.7	12.9	5.78	6.41	4.35	5.7	45	9	63	30	1.23	56	39	19
MAX.			3.3	200	12.4	14.9	6.1	11.2	8.9	10.0	68	22	87	35	3.20	70	TNTC	150
MIN.			0.4	50	9.7	11.7	5.5	3.3	1.0	1.1	12	0	50	24	0.45	50	0	0

10/18 FECAL COLIFORM result(with the approx.average increase of 200%)was used for TOTAL COLIFORM result in place of TNTC when calculating AVG

QUABBIN LABORATORY RECORDS 1993
WARE RIVER AND TRIBUTARIES
(M1) MATTY POND BROOK--@ HALE RD.

REVET ANALYSIS

DATE SAMP	KJELDAHL -N	AMMONIA -N	NIT-RITE -N	NIT-RATE -N	ORTHO PHOS-PHORUS	TOTAL PHOS-PHORUS	ALUM-INUM	CAD-MIUM	COP-PER	NICKEL	LEAD	ZINC	IRON	CAL-CIUM	ARSENIC	MERCURY	CHRO-MIUM	MANG-ANESE
06/01	0.95	0.050	<0.01	<0.1	<0.01	0.14	0.085	<0.004	<0.003	<0.03	<0.001	<0.003	2.190	2.69	<0.004	<0.0002	<0.009	0.104

QUABBIN LABORATORY RECORDS 1993
WARE RIVER AND TRIBUTARIES
(115) BRIGHAM POND---@ OUTLET

SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL
19	01/11	0.5				5.6	2.8	0.7	13.2	90	0				38	8	1
56	01/25	0.4				5.9	3.3	1.5	12.8	88	0				40	6	6
92	02/08	0.4	48	7.0	11.1	6.0	4.0	2.1	12.8	88	0	43	25	0.17	42	0	0
130	02/22	0.4				6.1	4.3	2.3	12.6	86	0				42	1	1
175	03/08	0.7				5.9	3.9	2.5	12.4	85	0				43	2	1
209	03/22	0.4				6.0	4.3	2.3	12.4	85	0				48	14	4
246	04/05	0.4				5.6	2.5	0.7	12.9	91	1				35	6	2
290	04/20	0.3				5.7	2.5	0.6	10.4	90	9				32	3	4
333	05/03	0.5	55	7.1	8.7	6.0	3.2	1.2	9.0	87	14	39	22	0.17	33	3	3
365	05/17	0.6				6.2	4.0	2.3			18				38	7	6
REVET 495	06/01	0.8		7.8	8.6	6.2	4.2	2.8	7.5	74	15				38	70	30
531	06/14	0.8				6.4	3.9	2.2	8.2	93	22				40	4	1
656	06/28	0.8				6.4	4.5	2.5	7.7	90	24				40	20	10
689	07/12	0.7				6.4	4.8	3.4	6.7	82	26				40	0	0
972	08/23	1.3				6.2	5.1	3.4	6.9	77	21				40	80	40
1272	10/18	0.7				6.2	4.4	2.2	9.3	82	10				48	17	6
1304	11/01	0.7	65	8.7	12.0	6.2	4.7	2.7	10.3	83	6	52	24	0.23	48	18	7
1401	11/15	0.7				6.1	4.5	2.5	10.8	87	6				48	20	3
1464	11/30	0.6				5.9	3.8	1.6	11.2	86	4				45	22	16
1533	12/13	0.4				5.6	2.4	0.3	13.0	89	0				40	17	7
1587	12/27	0.4				5.6	2.4	0.4	12.9	88	0				40	12	0
AVG.		0.6	56	7.7	10.1	6.01	3.79	1.91	10.7	86	8	45	24	0.19	41	16	7
MAX.		1.3	65	8.7	12.0	6.4	5.1	3.4	13.2	93	26	52	25	0.23	48	80	40
MIN.		0.3	48	7.0	8.6	5.6	2.4	0.3	6.7	74	0	39	22	0.17	32	0	0

QUABBIN LABORATORY RECORDS 1993
WARE RIVER AND TRIBUTARIES
(115) BRIGHAM POND---@ OUTLET

REVET ANALYSIS

DATE SAMP	KJELDAHL -N	AMMONIA -N	NIT-RITE -N	NIT-RATE -N	ORTHO PHOS-PHORUS	TOTAL PHOS-PHORUS	ALUM-INUM	CAD-MIUM	COP-PER	NICKEL	LEAD	ZINC	IRON	CAL-CIUM	ARSENIC	MERCURY	CHRO-MIUM	MANG-ANESE
06/01	0.88	<0.05	<0.01	<0.1	<0.01	0.03	0.106	<0.004	<0.003	<0.03	<0.001	0.007	0.368	2.00	<0.004	<0.0002	<0.009	0.052

QUABBIN LABORATORY RECORDS 1993
WARE RIVER AND TRIBUTARIES
(116A) ASHACOMET POND---@ BEACH

SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL
657	06/28	0.4				6.5	4.2	2.7	8.1	92	22				33	28	1
690	07/12	0.4				6.5	3.8	2.5	7.5	92	26				32	18	8
811	07/26	0.4				6.6	3.8	2.1	8.2	93	22				32	5	1
845	08/09	0.3		3.9	9.9	6.6	4.1	2.6	7.9	92	24				32	2	0
973	08/23	0.3				6.5	3.6	2.3	7.9	91	23				32	50	3
AVG.		0.4		3.9	9.9	6.54	3.90	2.44	7.9	92	23				32	21	3
MAX.		0.4		3.9	9.9	6.6	4.2	2.7	8.2	93	26				33	50	8
MIN.		0.3		3.9	9.9	6.5	3.6	2.1	7.5	91	22				32	2	0

(116) ASHACOMET POND---@ OUTLET

	SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL
	20	01/11	0.3				6.4	4.3	2.4	12.6	91	2				32	0	0
	57	01/25	0.3				6.5	4.7	2.6	12.3	84	0				33	1	0
	93	02/08	0.3	7	5.5	8.7	6.5	5.1	3.1	11.9	89	3	27	13	0.03	35	1	0
	131	02/22	0.3				6.4	4.5	2.6	11.6	79	0				35	1	0
	176	03/08	0.2				6.2	3.6	2.5	11.9	84	1				35	5	0
	210	03/22	0.2				6.3	5.0	3.1	11.6	82	1				35	0	0
	247	04/05	0.2				6.1	4.3	2.3	12.7	94	3				32	0	0
	291	04/20	0.3				6.3	4.7	2.6	11.1	89	6				32	1	1
	334	05/03	0.3	5	5.5	10.6	6.4	4.2	2.3	10.4	96	12	28	17	0.04	32	1	0
	366	05/17	0.3				6.5	4.0	2.2			15				32	2	2
REVET	496	06/01	0.3		5.0	10.6	6.5	4.2	2.4	9.0	89	15				32	6	4
	532	06/14	0.4				6.5	4.1	2.6	8.2	88	19				35	10	5
	1305	11/01	0.4	10	5.5	8.1	6.4	4.2	2.3	9.1	79	9	24	9	0.06	32	11	3
	1402	11/15	0.3				6.6	4.5	2.4	10.4	92	10				33	7	0
	1465	11/30	0.4				6.6	4.4	2.3	11.2	87	5				33	2	0
	1534	12/13	0.4				6.5	4.4	2.7	12.4	90	2				32	5	0
	1588	12/27	0.3				6.5	4.2	2.6	12.6	91	2				33	2	0
	AVG.		0.3	7	5.4	9.5	6.42	4.38	2.53	11.2	88	6	26	13	0.04	33	3	1
	MAX.		0.4	10	5.5	10.6	6.6	5.1	3.1	12.7	96	19	28	17	0.06	35	11	5
	MIN.		0.2	5	5.0	8.1	6.1	3.6	2.2	8.2	79	0	24	9	0.03	32	0	0

REVET ANALYSIS

QUABBIN LABORATORY RECORDS 1993
(116) ASHACOMET POND---@ OUTLET

DATE SAMP	KJELDAHL -N	AMMONIA -N	NIT-RITE -N	NIT-RATE -N	ORTHO PHOS-PHORUS	TOTAL PHOS-PHORUS	ALUM-INUM	CAD-MIUM	COP-PER	NICKEL	LEAD	ZINC	IRON	CAL-CIUM	ARSENIC	MERCURY	CHRO-MIUM	MANG-ANESE
06/01	1.12	<0.05	<0.01	<0.1	<0.01	0.09	<0.02	<0.004	<0.003	<0.03	<0.001	0.005	0.018	1.80	<0.004	<0.0002	<0.009	0.014

QUABBIN LABORATORY RECORDS 1993
WARE RIVER AND TRIBUTARIES
(107) WEST BR. OF WARE RIVER--@ RT. #62

SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL
21	01/11	0.4				5.8	3.5	1.3	12.8	88	0				43	6	1
58	01/25	0.6				6.0	3.5	1.4	12.4	85	0				50	29	6
94	02/08	0.4	48	9.5	10.3	6.1	3.9	1.8	13.0	89	0	47	28	0.20	48	2	0
132	02/22	0.4				6.1	5.0	3.2	11.7	80	0				52	3	1
177	03/08	0.4				6.0	4.7	3.5	11.8	81	0				57	4	0
211	03/22	0.4				6.0	4.5	2.5	11.8	81	0				62	8	3
248	04/05	0.3				5.7	2.6	0.8	12.6	86	0				42	2	2
292	04/20	0.3				5.8	3.3	1.1	9.6	83	9				38	1	0
335	05/03	0.5	60	8.8	9.2	6.0	3.7	1.9	8.3	78	13	43	25	0.27	42	3	2
367	05/17	1.0				6.2	4.7	2.8			16				47	40	32
REVET 497	06/01	1.0		12.4	10.8	6.1	5.0	3.1	7.6	72	13				58	350	320
533	06/14	1.0				6.2	5.5	3.6	6.6	68	17				47	100	70
659	06/28	0.9				6.3	6.9	5.2	5.4	60	21				45	450	350
692	07/12	1.0				6.2	6.2	4.6	4.6	51	21				50	140	100
813	07/26	0.9				6.4	7.7	5.9	6.3	67	19				48	140	130
847	08/09	0.9	55	8.2	10.4	6.3	7.4	5.7	5.6	61	20	46	23	0.70	48	250	190
974	08/23	1.0				6.2	6.3	4.7	7.0	72	17				48	160	80
1005	09/07	1.2				6.1	7.1	5.2	6.2	66	19				50	200	150
1124	09/20	1.3				6.2	6.8	5.2	7.7	68	10				50	100	20
1154	10/04	0.7				6.0	5.5	3.2	7.2	64	10				60	25	12
1273	10/18	0.6				6.0	5.5	3.3	6.7	61	11				58	30	19
1306	11/01	0.7	80	10.0	18.3	5.9	4.5	2.6	8.4	67	6	56	27	0.42	55	29	21
1403	11/15	0.5				6.0	4.6	2.5	8.4	71	8				58	30	4
1466	11/30	0.5				5.8	3.9	1.8	10.8	80	3				50	26	14
1535	12/13	0.4				5.8	3.2	1.1	12.6	86	0				43	5	2
1589	12/27	0.3				5.7	3.1	1.1	12.0	82	0				48	4	2
AVG.		0.7	61	9.8	11.8	6.03	4.95	3.04	9.1	74	9	48	26	0.40	50	82	59
MAX.		1.3	80	12.4	18.3	6.4	7.7	5.9	13.0	89	21	56	28	0.70	62	450	350
MIN.		0.3	48	8.2	9.2	5.7	2.6	0.8	4.6	51	0	43	23	0.20	38	1	0

QUABBIN LABORATORY RECORDS 1993
WARE RIVER AND TRIBUTARIES
(107) WEST BR. OF WARE RIVER--@ RT. #62 REVET ANALYSIS

DATE SAMP	KJELDAHL -N	AMMONIA -N	NIT-RITE -N	NIT-RATE -N	ORTHO PHOS-PHORUS	TOTAL PHOS-PHORUS	ALUM-INUM	CAD-MIUM	COP-PER	NICKEL	LEAD	ZINC	IRON	CAL-CIUM	ARSENIC	MERCURY	CHRO-MIUM	MANG-ANESE
06/01	0.91	<0.05	<0.01	<0.1	<0.01	0.09	0.114	<0.004	0.003	<0.03	<0.001	0.003	0.650	2.64	<0.004	<0.0002	<0.009	0.096

QUABBIN LABORATORY RECORDS 1993
WARE RIVER AND TRIBUTARIES
(105) WARE RIVER---@ BARRE FALLS

	SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL
	249	04/05	0.4				5.6	2.9	0.9	11.2	79	1				43	0	0
	293	04/20	0.3				5.8	4.2	2.1	8.7	77	10				48	0	0
	336	05/03	0.8	60	13.3	10.9	6.2	5.4	3.6	8.2	77	13	53	34	0.37	58	4	3
	368	05/17	1.5				6.4	7.3	5.6			16				68	34	28
REVET	498	06/01	1.5		12.3	11.6	6.3	6.7	5.2	7.8	74	13				60	600	550
	534	06/14	1.7				6.4	7.3	5.4	7.2	69	14				65	200	70
	660	06/28	2.3				6.4	9.4	7.8	6.3	72	23				62	150	30
	693	07/12	2.0				6.3	7.9	6.1	5.3	61	23				62	90	10
	814	07/26	2.0				6.5	10.4	8.3	6.3	69	20				65	700	500
	848	08/09	2.2	70	15.2	14.8	6.6	10.7	9.3	6.6	73	21	69	42	1.10	82	150	110
	975	08/23	1.5				6.1	6.4	4.6	6.6	69	18				60	90	65
	1006	09/07	2.0				6.2	10.3	8.7	6.1	66	20				80	60	40
	1125	09/20	2.0				6.3	9.7	8.0	7.4	70	13				65	80	40
	1155	10/04	0.9				6.0	5.2	3.0	8.0	71	10				68	28	13
	1274	10/18	0.8				6.0	5.6	3.6	8.2	72	10				70	19	13
	1307	11/01	0.9	90	13.1	16.2	6.0	4.9	2.7	10.3	80	5	68	33	0.47	67	50	39
	1404	11/15	0.7				6.2	5.5	3.6	11.4	96	8				73	35	5
	1467	11/30	0.6				5.7	3.5	1.6	10.0	77	4				55	40	35
	1536	12/13	0.4				5.7	3.1	1.4	12.8	90	1				57	6	3
	AVG.		1.3	73	13.5	13.4	6.14	6.65	4.82	8.2	75	13	63	36	0.65	64	123	82
	MAX.		2.3	90	15.2	16.2	6.6	10.7	9.3	12.8	96	23	69	42	1.10	82	700	550
	MIN.		0.3	60	12.3	10.9	5.6	2.9	0.9	5.3	61	1	53	33	0.37	43	0	0

(104)(C1) CANESTO + MATTY BROOKS AT JUNCTION--@ RT. #62

	SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL
	23	01/11	0.4				6.0	2.7	0.7	13.4	92	0				50	0	0
	60	01/25	0.5				6.1	3.7	1.9	13.4	92	0				48	6	4
	95	02/08	0.4	35	10.0	10.1	6.2	4.9	3.1	12.8	88	0	47	32	0.28	53	1	0
	133	02/22	0.5				6.2	5.1	3.0	13.2	90	0				55	5	1
	178	03/08	0.5				6.1	4.0	2.6	13.0	89	0				55	14	0
	212	03/22	0.5				6.1	4.7	2.8	13.0	89	0				57	4	0
	250	04/05	0.4				5.8	2.5	0.4	13.3	91	0				47	4	0
	294	04/20	0.3				5.8	2.9	0.3	9.4	79	8				42	3	2
	337	05/03	0.5	55	8.4	11.0	6.1	3.0	1.1	10.2	92	11	46	28	0.35	45	4	1
	369	05/17	0.9				6.3	5.0	3.3			13				48	9	8
REVET	499	06/01	1.3		8.4	8.3	6.2	4.4	2.6	9.6	87	11				42	300	250
	535	06/14	1.5				6.4	5.7	4.1	8.4	76	11				50	30	0
	661	06/28	2.2				6.5	7.0	5.3	7.9	85	19				47	60	40
	694	07/12	1.8				6.4	7.0	5.1	3.8	41	20				50	80	10
	815	07/26	2.3				6.6	7.8	5.7	8.1	81	16				47	20	0
	849	08/09	1.8	140	10.4	9.4	6.5	7.4	5.8	6.8	71	18	66	32	2.00	48	20	20
	976	08/23	1.5				6.3	6.0	4.1	8.4	83	15				48	70	40
	1007	09/07	2.3				6.3	7.4	5.7	8.3	85	17				48	70	30
	1126	09/20	2.2				6.4	6.8	5.1	9.8	85	9				48	150	40
	1156	10/04	0.9				6.3	5.1	3.2	9.7	84	9				48	29	17
	1275	10/18	0.8				6.0	4.0	1.7	9.9	87	10				48	140	80
	1308	11/01	0.7	80	10.3	13.2	6.0	3.7	1.6	11.4	89	5	53	26	0.62	48	36	29
	1405	11/15	0.5				6.2	3.6	1.5	10.8	93	9				52	58	31
	1468	11/30	0.5				5.9	2.9	0.7	12.2	88	2				50	27	25
	1537	12/13	0.4				5.8	2.8	0.8	13.8	94	0				48	5	2
	1590	12/27	0.4				5.9	2.9	1.2	12.6	86	0				52	3	1
	AVG.		1.0	78	9.5	10.4	6.17	4.73	2.82	10.5	85	8	53	30	0.81	49	44	24
	MAX.		2.3	140	10.4	13.2	6.6	7.8	5.8	13.8	94	20	66	32	2.00	57	300	250
	MIN.		0.3	35	8.4	8.3	5.8	2.5	0.3	3.8	41	0	46	26	0.28	42	0	0

QUABBIN LABORATORY RECORDS 1993
WARE RIVER AND TRIBUTARIES

(105) WARE RIVER---@ BARRE FALLS — REVET ANALYSIS

DATE SAMP	KJELDAHL -N	AMMONIA -N	NIT-RITE -N	NIT-RATE -N	ORTHO PHOS-PHORUS	TOTAL PHOS-PHORUS	ALUM-INUM	CAD-MIUM	COP-PER	NICKEL	LEAD	ZINC	IRON	CAL-CIUM	ARSENIC	MERCURY	CHRO-MIUM	MANG-ANESE
06/01	1.40	<0.05	<0.01	0.10	<0.01	0.11	0.103	<0.004	<0.003	<0.03	0.001	<0.003	0.812	3.10	<0.004	<0.0002	<0.009	0.074

(104)(C1) CANESTO + NATTY BROOKS AT JUNCTION--@ RT. #62

06/01	0.77	<0.05	<0.01	<0.1	<0.01	0.10	0.223	0.004	<0.003	<0.03	0.002	0.005	1.460	2.23	<0.004	<0.0002	<0.009	0.131

QUABBIN LABORATORY RECORDS 1993
WARE RIVER AND TRIBUTARIES
(103)(B1) BURNSHIRT RIVER--@ RT.#62

SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL
24	01/11	0.4				5.7	2.8	0.6	13.6	93	0				43	1	0
61	01/25	0.6				5.9	2.7	0.6	13.1	90	0				43	8	1
96	02/08	0.4	40	9.1	9.5	6.0	3.5	1.4	13.0	89	0	43	27	0.17	50	4	1
134	02/22	0.4				6.0	3.4	1.7	13.2	90	0				52	3	2
179	03/08	0.4				6.0	3.5	2.4	13.0	89	0				52	7	2
213	03/22	0.4				6.0	3.6	1.6	13.0	89	0				60	7	3
251	04/05	0.3				5.6	2.7	0.9	13.0	89	0				43	1	0
295	04/20	0.3				5.6	2.4	0.5	9.4	79	8				38	6	3
338	05/03	0.4	48	9.4	11.0	5.9	3.0	1.2	9.5	90	13	40	25	0.23	42	2	1
370	05/17	0.6				6.1	3.1	1.3			15				42	3	1
REVET 500	06/01	0.8		8.6	9.6	6.0	2.9	1.3	9.2	87	13				42	80	60
536	06/14	0.6				6.2	3.4	2.0	8.1	73	11				47	130	80
662	06/28	0.6				6.3	3.6	1.9	8.1	88	20				43	50	50
695	07/12	0.6				6.1	3.0	1.8	6.3	70	21				42	TNTC	28
816	07/26	0.6				6.4	4.6	3.0	8.7	90	17				42	50	30
850	08/09	0.8	60	7.5	8.5	6.3	4.1	2.4	7.8	85	20	43	23	0.93	42	12	10
977	08/23	0.6				6.3	4.0	2.5	8.7	86	15				42	50	19
1008	09/07	0.7				6.3	5.3	3.4	8.4	88	18				42	80	50
1127	09/20	0.9				6.3	5.2	3.4	9.8	85	9				40	70	60
1157	10/04	0.5				6.2	4.0	1.9	9.7	86	10				42	34	22
1276	10/18	0.4				6.2	3.7	1.7	9.8	87	10				43	8	8
1309	11/01	0.5	75	11.1	11.2	6.0	2.9	0.8	11.2	90	6	53	25	0.43	50	22	16
1406	11/15	0.4				6.0	3.3	1.6	11.0	95	9				48	47	3
1469	11/30	0.4				5.6	2.9	0.9	12.0	89	3				48	10	7
1538	12/13	0.3				5.6	2.6	0.9	13.5	92	0				43	7	1
1591	12/27	0.3				5.6	2.6	0.7	12.8	88	0				50	9	1
AVG.		0.5	56	9.1	10.0	6.01	3.42	1.63	10.6	87	8	45	25	0.44	45	29	18
MAX.		0.9	75	11.1	11.2	6.4	5.3	3.4	13.6	95	21	53	27	0.93	60	TNTC	80
MIN.		0.3	40	7.5	8.5	5.6	2.4	0.5	6.3	70	0	40	23	0.17	38	1	0

7/12 FECAL COLIFORM result(with the approx.average increase of 163%)was used for TOTAL COLIFORM result in place of TNTC when calculating AVG.

QUABBIN LABORATORY RECORDS 1993
WARE RIVER AND TRIBUTARIES
(103)(B1) BURNSHIRT RIVER--@ RT.#62

REVET ANALYSIS

DATE SAMP	KJELDAHL -N	AMMONIA -N	NIT-RITE -N	NIT-RATE -N	ORTHO PHOS-PHORUS	TOTAL PHOS-PHORUS	ALUM-INUM	CAD-MIUM	COP-PER	NICKEL	LEAD	ZINC	IRON	CAL-CIUM	ARSENIC	MERCURY	CHRO-MIUM	MANG-ANESE
06/01	1.20	<0.05	<0.01	<0.1	<0.01	0.21	0.124	0.004	<0.003	<0.03	0.002	0.006	0.595	1.79	<0.004	<0.0002	<0.009	0.036

QUABBIN LABORATORY RECORDS 1993
WARE RIVER AND TRIBUTARIES
(108) EAST BR. OF WARE RIVER---@ NEW BOSTON

SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL
26	01/11	0.4				6.0	3.2	1.3	13.3	91	0				47	3	2
63	01/25	0.4				6.2	3.8	1.7	13.3	91	0				50	17	4
98	02/08	0.5	32	10.9	13.3	6.2	5.4	3.3	12.3	84	0	46	31	0.15	55	1	1
136	02/22	0.5				6.2	5.4	3.3	12.5	86	0				57	2	0
181	03/08	0.5				6.1	5.3	4.3	12.7	87	0				57	4	2
215	03/22	0.4				6.0	5.0	3.1	12.5	86	0				55	2	2
254	04/05	0.4				5.8	2.5	0.8	13.4	92	0				45	3	0
297	04/20	0.3				6.0	3.4	1.4	10.3	89	9				43	4	0
340	05/03	0.6	45	9.2	9.6	6.2	4.4	2.8	9.0	85	13	44	28	0.23	50	5	5
372	05/17	1.3				6.4	6.6	5.1	8.0	79	15				55	70	60
REVET 502	06/01	1.3		11.1	10.2	6.3	6.1	4.4	8.4	79	13				57	130	100
538	06/14	1.2				6.4	6.6	4.8	6.9	75	20				53	150	100
664	06/28	1.7				6.4	9.2	7.2	5.9	67	22				58	200	160
697	07/12	1.8				6.3	9.3	7.9	5.0	58	23				60	180	160
818	07/26	1.7				6.5	10.6	8.7	6.5	68	18				60	50	20
852	08/09	1.5	55	11.5	12.8	6.4	10.3	8.5	5.7	62	20	58	34	0.88	63	30	10
979	08/23	1.3				6.3	8.9	7.3	6.4	66	17				65	100	40
1010	09/07	1.3				6.2	11.0	9.3	5.3	57	19				68	30	0
1129	09/20	1.3				6.3	10.5	8.7	6.4	58	11				70	50	14
1159	10/04	0.9				6.2	7.1	5.0	6.8	61	11				68	60	45
1278	10/18	0.7				6.2	5.8	3.6	8.2	74	11				70	29	21
1311	11/01	0.8	70	12.0	14.0	6.2	4.9	2.7	10.6	83	5	61	30	0.40	63	110	70
1408	11/15	0.6				6.2	4.8	2.7	9.5	80	8				62	50	16
1471	11/30	0.6				5.8	3.5	1.5	11.4	85	3				52	27	26
1540	12/13	0.4				5.9	3.4	1.6	12.5	86	0				50	21	6
1593	12/27	0.4				5.8	3.2	1.4	13.0	89	0				50	2	0
AVG.		0.9	51	10.9	12.0	6.17	6.16	4.32	9.5	78	9	52	31	0.42	57	51	33
MAX.		1.8	70	12.0	14.0	6.5	11.0	9.3	13.4	92	23	61	34	0.88	70	200	160
MIN.		0.3	32	9.2	9.6	5.8	2.5	0.8	5.0	57	0	44	28	0.15	43	1	0

QUABBIN LABORATORY RECORDS 1993
WARE RIVER AND TRIBUTARIES
(108) EAST BR. OF WARE RIVER---@ NEW BOSTON REVET ANALYSIS

DATE SAMP	KJELDAHL -N	AMMONIA -N	NIT-RITE -N	NIT-RATE -N	ORTHO PHOS-PHORUS	TOTAL PHOS-PHORUS	ALUM-INUM	CAD-MIUM	COP-PER	NICKEL	LEAD	ZINC	IRON	CAL-CIUM	ARSENIC	MERCURY	CHRO-MIUM	MANG-ANESE
06/01	0.83	<0.05	<0.01	0.14	<0.01	0.17	0.112	<0.004	<0.003	<0.03	0.002	0.009	0.580	3.05	<0.004	<0.0002	<0.009	0.077

QUABBIN LABORATORY RECORDS 1993
WARE RIVER AND TRIBUTARIES
(109) LONGMEADOW BROOK---@ MOUTH

	SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL
	27	01/11	0.4				6.2	6.7	5.0	11.6	79	0				88	4	1
	64	01/25	0.4				6.4	6.5	4.4	11.5	79	0				90	4	2
	99	02/08	0.5	27	27.2	18.0	6.5	9.5	7.4	10.7	73	0	80	64	0.15	125	0	0
	137	02/22	0.5				6.3	9.0	7.0	9.9	68	0				128	1	0
	182	03/08	0.4				6.2	9.0	8.0	9.7	66	0				137	6	0
	255	04/05	0.4				5.8	3.4	1.5	12.6	86	0				52	1	0
	298	04/20	0.3				6.0	5.6	3.6	8.1	72	10				98	17	6
	341	05/03	0.9	50	26.3	16.9	6.3	9.3	7.5	6.0	57	13	81	55	0.45	117	11	12
	373	05/17	1.7				6.4	10.9	9.2	6.9	68	15				122	27	25
REVET	503	06/01	1.8		21.3	17.1	6.3	10.1	8.5	6.3	59	13				103	150	100
	539	06/14	2.2				6.5	12.7	11.2	6.9	74	19				128	100	80
	665	06/28	2.8				6.6	15.7	14.1	6.1	68	21				110	TNTC	TNTC
	698	07/12	2.5				6.5	15.0	13.3	4.9	54	21				120	TNTC	92
	819	07/26	2.5				6.6	18.5	16.5	5.0	54	19				95	200	90
	853	08/09	1.5	60	33.7	25.5	6.2	9.6	8.0	5.0	54	19	117	76	1.18	160	1000	700
	980	08/23	1.8				6.2	12.9	11.1	5.0	50	16				103	120	60
	1011	09/07	1.5				6.2	13.6	11.4	2.2	24	19				135	100	70
	1130	09/20	1.8				6.2	18.2	16.3	2.2	20	11				108	100	60
	1160	10/04	0.7				6.0	8.3	6.2	3.8	34	10				120	13	10
	1279	10/18	0.7				6.1	7.0	4.8	4.2	38	11				78	6	3
	1312	11/01	0.6	70	24.4	16.7	6.2	8.4	6.2	7.9	62	5	82	53	0.53	110	19	15
	1409	11/15	0.4				6.2	7.8	5.7	7.9	67	8				135	30	2
	1472	11/30	0.5				5.9	3.6	1.6	9.9	74	3				78	25	24
	1541	12/13	0.4				6.2	6.0	4.0	11.8	81	0				100	6	3
	1594	12/27	0.4				6.2	6.0	4.1	11.4	78	0				118	4	0
AVG.			1.1	52	26.6	18.8	6.25	9.73	7.86	7.5	61	9	90	62	0.58	110	85	56
MAX.			2.8	70	33.7	25.5	6.6	18.5	16.5	12.6	86	21	117	76	1.18	160	TNTC	TNTC
MIN.			0.3	27	21.3	16.7	5.8	3.4	1.5	2.2	20	0	80	53	0.15	52	0	0

When figuring the TOTAL and FECAL COLIFORM average, the TNTC'S were not included. The average would be higher then shown.

QUABBIN LABORATORY RECORDS 1993
WARE RIVER AND TRIBUTARIES
(109) LONGMEADOW BROOK---@ MOUTH

REVET ANALYSIS

DATE SAMP	KJELDAHL -N	AMMONIA -N	NIT-RITE -N	NIT-RATE -N	ORTHO PHOS-PHORUS	TOTAL PHOS-PHORUS	ALUM-INUM	CAD-MIUM	COP-PER	NICKEL	LEAD	ZINC	IRON	CAL-CIUM	ARSENIC	MERCURY	CHRO-MIUM	MANG-ANESE
06/01	0.95	0.060	<0.01	0.20	<0.01	0.15	0.096	<0.004	<0.003	<0.03	0.003	0.003	1.020	4.96	<0.004	<0.0002	<0.009	0.221

QUABBIN LABORATORY RECORDS 1993
WARE RIVER AND TRIBUTARIES
(121) MILL BROOK---@ CHARNOCK HILL RD.

SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL
28	01/11	0.6				6.4	7.1	5.3	13.0	89	0				120	4	0
65	01/25	0.5				6.4	6.6	4.8	12.7	87	0				108	7	1
100	02/08	0.5	33	36.3	22.9	6.6	9.8	8.0	12.3	84	0	101	79	0.25	160	1	0
138	02/22	0.6				6.5	10.9	9.1	12.3	84	0				175	3	1
183	03/08	0.5				6.4	11.0	9.5	12.2	83	0				200	5	2
217	03/22	0.5				6.5	10.4	8.7	12.5	86	0				210	4	1
256	04/05	0.4				6.2	4.5	2.6	13.0	89	0				100	1	0
299	04/20	0.4				6.4	5.8	4.2	9.8	87	10				120	1	0
342	05/03	0.7	45	27.3	16.9	6.5	9.3	7.5	8.3	78	13	85	63	0.28	125	20	19
374	05/17	1.2				6.5	13.4	11.5	7.4	74	16				145	55	47
REVET 504	06/01	1.8		27.7	19.2	6.5	14.0	12.2	7.7	73	13				130	400	350
540	06/14	1.2				6.7	18.3	16.7	7.2	77	19				140	80	50
666	06/28	1.8				6.8	31.1	29.1	6.4	68	19				150	250	130
699	07/12	2.2				6.8	26.0	24.1	5.7	63	21				143	130	40
820	07/26	2.3				6.9	33.8	31.9	7.2	74	17				165	30	10
854	08/09	1.7	75	37.3	21.4	6.5	11.5	10.1	6.8	73	19	118	78	1.50	160	70	60
981	08/23	2.2				6.7	35.1	33.5	6.6	65	15				170	11	6
1012	09/07	2.0				6.6	21.1	19.1	6.7	72	19				168	90	50
1131	09/20	2.3				6.7	29.6	27.8	7.7	68	10				158	70	22
1161	10/04	1.7				6.6	13.0	11.0	8.6	76	10				143	25	18
1280	10/18	0.9				6.6	11.9	9.8	8.8	78	10				148	90	55
1313	11/01	0.8	55	28.8	20.0	6.4	10.2	8.2	9.0	70	5	97	66	0.52	132	100	65
1410	11/15	0.5				6.5	10.1	7.9	9.2	78	8				180	45	5
1473	11/30	0.5				6.3	6.8	5.0	10.4	77	3				153	16	6
1542	12/13	0.4				6.4	6.8	4.8	11.7	80	0				132	4	0
1595	12/27	0.4				6.3	6.7	4.9	12.0	82	0				133	6	2
AVG.		1.1	52	31.5	20.1	6.53	14.42	12.59	9.4	78	9	100	72	0.64	149	58	36
MAX.		2.3	75	37.3	22.9	6.9	35.1	33.5	13.0	89	21	118	79	1.50	210	400	350
MIN.		0.4	33	27.3	16.9	6.2	4.5	2.6	5.7	63	0	85	63	0.25	100	1	0

QUABBIN LABORATORY RECORDS 1993
WARE RIVER AND TRIBUTARIES
(121) MILL BROOK---@ CHARNOCK HILL RD. REVET ANALYSIS

DATE SAMP	KJELDAHL -N	AMMONIA -N	NIT-RITE -N	NIT-RATE -N	ORTHO PHOS-PHORUS	TOTAL PHOS-PHORUS	ALUM-INUM	CAD-MIUM	COP-PER	NICKEL	LEAD	ZINC	IRON	CAL-CIUM	ARSENIC	MERCURY	CHRO-MIUM	MANG-ANESE
06/01	0.67	<0.05	<0.01	0.20	<0.01	0.14	0.116	<0.004	<0.003	<0.03	<0.001	0.003	1.750	6.25	<0.004	<0.0002	<0.009	0.329

QUABBIN LABORATORY RECORDS 1993
WARE RIVER AND TRIBUTARIES
(110) LONG + WHITEHALL PONDS--@ OUTLET

SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL
29	01/11	0.6				6.5	7.5	5.7	12.6	89	1				93	3	0
66	01/25	0.4				6.4	7.6	5.8	11.0	77	1				108	0	0
101	02/08	0.4	25	26.6	19.8	6.5	8.6	6.8	12.3	89	2	75	58	0.12	120	0	0
139	02/22	0.5				6.3	9.1	7.4	12.0	82	0				135	0	0
184	03/08	0.4				6.2	8.6	7.3	11.8	85	2				142	1	0
218	03/22	0.5				6.1	8.4	6.8	8.3	57	0				127	0	0
257	04/05	0.5				6.1	6.1	4.6	10.8	76	1				105	2	0
300	04/20	0.3				6.5	6.1	4.4	11.0	97	10				105	1	0
343	05/03	0.4	20	32.3	18.0	6.6	6.4	4.6	9.4	93	15	84	61	0.12	135	1	0
375	05/17	0.4				6.7	6.8	5.0	8.5	91	19				140	1	0
REVET 505	06/01	0.4		34.0	15.1	6.6	7.1	5.5	8.0	82	17				142	4	2
541	06/14	0.4				6.8	8.1	6.7	8.0	90	22				150	2	0
667	06/28	0.4				6.8	8.0	6.4	8.0	94	24				153	4	1
700	07/12	0.5				6.9	8.1	6.7	7.1	88	27				155	6	0
982	08/23	0.6				6.7	9.3	8.0	7.0	81	23				158	0	0
1013	09/07	0.6				6.6	9.8	7.9	7.0	82	24				158	14	9
1132	09/20	0.8				6.6	9.5	7.6	7.0	74	18				158	1	0
1162	10/04	0.5				6.8	9.2	7.3	8.4	81	14				158	4	2
1281	10/18	0.4				6.9	9.1	7.2	9.2	85	12				160	2	0
1314	11/01	0.5	17	39.5	19.1	6.9	9.1	7.3	9.7	82	8	95	76	0.08	162	1	0
1411	11/15	0.4				6.9	9.2	7.4	10.8	91	8				162	8	0
1474	11/30	0.4				6.8	9.0	7.1	10.6	83	5				150	5	2
1543	12/13	0.5				6.6	7.5	5.6	11.0	80	2				113	2	0
1596	12/27	0.4				6.5	8.1	6.4	12.8	90	1				132	5	0
AVG.		0.5	21	33.1	18.0	6.60	8.18	6.48	9.7	84	11	85	65	0.11	138	3	1
MAX.		0.8	25	39.5	19.8	6.9	9.8	8.0	12.8	97	27	95	76	0.12	162	14	9
MIN.		0.3	17	26.6	15.1	6.1	6.1	4.4	7.0	57	0	75	58	0.08	93	0	0

QUABBIN LABORATORY RECORDS 1993
WARE RIVER AND TRIBUTARIES
(110) LONG + WHITEHALL PONDS--@ OUTLET REVET ANALYSIS

DATE SAMP	KJELDAHL -N	AMMONIA -N	NIT-RITE -N	NIT-RATE -N	ORTHO PHOS-PHORUS	TOTAL PHOS-PHORUS	ALUM-INUM	CAD-MIUM	COP-PER	NICKEL	LEAD	ZINC	IRON	CAL-CIUM	ARSENIC	MERCURY	CHRO-MIUM	MANG-ANESE
06/01	1.04	<0.05	<0.01	0.15	<0.01	0.09	0.020	<0.004	<0.003	<0.03	<0.001	0.003	0.121	4.85	<0.004	<0.0002	<0.009	0.015

QUABBIN LABORATORY RECORDS 1993
WARE RIVER AND TRIBUTARIES
(119) DEMON POND---@ OUTLET

SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL
30	01/11	0.6				6.7	9.8	8.1	13.0	94	2				78	10	3
67	01/25	0.4				6.6	9.0	7.0	13.2	95	2				72	0	0
102	02/08	0.4	30	14.2	17.7	6.7	11.3	9.3	12.4	90	2	60	36	0.07	83	0	0
140	02/22	0.4				6.6	11.8	9.7	11.3	82	2				85	1	0
185	03/08	0.3				6.4	11.3	9.8	10.3	72	1				88	2	0
219	03/22	0.3				6.4	11.4	9.2	9.7	68	1				83	0	0
258	04/05	0.4				6.1	5.3	3.7	12.2	86	1				50	0	0
301	04/20	0.5				6.7	9.0	7.2	10.8	93	9				73	0	0
344	05/03	0.5	25	13.7	18.4	6.8	9.4	7.7	9.8	97	15	57	37	0.05	77	22	19
376	05/17	0.5				6.8	9.5	7.7	7.9	83	18				78	31	22
REVET 506	06/01	0.6		12.7	15.2	6.8	9.4	7.8	8.2	82	16				75	80	55
542	06/14	0.7				6.9	9.8	8.3	7.8	88	22				78	60	43
668	06/28	0.5				6.9	9.8	8.1	7.3	84	23				78	9	8
701	07/12	0.6				6.8	9.4	7.9	6.1	74	26				78	68	46
1282	10/18	0.4				7.0	10.8	8.9	9.2	85	12				80	13	3
1315	11/01	0.5	20	15.3	15.4	6.9	10.5	8.5	10.2	84	7	52	32	0.06	78	10	7
1412	11/15	0.4				7.0	10.4	8.9	10.9	96	10				80	12	3
1475	11/30	0.5				7.0	10.3	8.3	11.0	86	5				80	11	6
1544	12/13	0.5				6.9	9.3	7.4	11.8	83	1				80	12	0
1597	12/27	0.5				6.8	8.8	6.9	12.6	89	1				82	4	0
AVG.		0.5	25	14.0	16.7	6.74	9.82	8.02	10.3	86	9	56	35	0.06	78	17	11
MAX.		0.7	30	15.3	18.4	7.0	11.8	9.8	13.2	97	26	60	37	0.07	88	80	55
MIN.		0.3	20	12.7	15.2	6.1	5.3	3.7	6.1	68	1	52	32	0.05	50	0	0

QUABBIN LABORATORY RECORDS 1993
WARE RIVER AND TRIBUTARIES
(119) DEMON POND---@ OUTLET

REVET ANALYSIS

DATE SAMP	KJELDAHL -N	AMMONIA -N	NIT-RITE -N	NIT-RATE -N	ORTHO PHOS-PHORUS	TOTAL PHOS-PHORUS	ALUM-INUM	CAD-MIUM	COP-PER	NICKEL	LEAD	ZINC	IRON	CAL-CIUM	ARSENIC	MERCURY	CHRO-MIUM	MANG-ANESE
06/01	1.23	<0.05	<0.01	<0.1	<0.01	0.07	0.041	<0.004	<0.003	<0.03	<0.001	0.004	0.098	4.15	<0.004	<0.0002	<0.009	0.007

QUABBIN LABORATORY RECORDS 1993
WARE RIVER AND TRIBUTARIES
(102) PARKER BROOK--NEAR MOUTH

	SAMP NO.	DATE SAMP	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL
	31	01/11	0.5				6.3	4.6	2.5	13.9	95	0				68	0	0
	68	01/25	0.6				6.3	4.3	2.4	13.6	96	1				58	4	4
	103	02/08	0.5	33	18.5	12.6	6.6	6.3	4.5	13.5	92	0	63	50	0.38	83	0	0
	141	02/22	0.6				6.6	6.0	4.0	13.2	90	0				88	0	0
	186	03/08	0.5				6.4	5.5	4.3	13.0	91	1				88	3	0
	220	03/22	0.5				6.4	5.6	3.8	13.1	95	2				85	1	0
	259	04/05	0.4				6.1	3.0	1.1	13.5	95	1				68	1	0
	302	04/20	0.4				6.2	3.8	1.8	12.0	101	8				75	1	0
	345	05/03	0.7	45	23.7	15.6	6.4	5.0	3.2	11.5	99	9	76	59	0.42	100	5	0
	377	05/17	1.0				6.5	5.6	3.7	12.4	112	11				103	25	26
REVET	507	06/01	1.2		17.8	12.6	6.3	5.1	3.6	10.8	95	10				80	110	100
	543	06/14	1.3				6.5	6.9	5.5	10.3	99	14				102	50	40
	669	06/28	1.7				6.5	7.3	5.7	10.1	99	15				102	450	450
	702	07/12	1.8				6.5	7.1	5.5	8.8	87	15				103	50	40
	823	07/26	1.8				6.7	8.2	6.5	10.4	100	14				103	50	10
	857	08/09	2.0	50	21.3	16.0	6.6	8.3	7.0	10.0	97	14	77	50	0.93	102	60	40
	984	08/23	2.2				6.6	7.9	6.6	10.1	93	12				102	50	23
	1015	09/07	2.3				6.6	8.2	6.2	9.8	95	14				102	80	57
	1133	09/20	2.5				6.6	8.0	6.5	11.2	95	8				103	40	20
	1163	10/04	1.7				6.6	6.7	4.7	10.7	90	8				98	11	3
	1283	10/18	0.9				6.6	6.9	5.1	10.6	94	10				98	17	13
	1316	11/01	0.9	85	17.5	11.9	6.3	4.8	3.2	11.6	93	6	69	43	0.60	75	11	7
	1413	11/15	0.8				6.5	6.3	4.4	11.1	94	8				90	25	1
	1476	11/30	0.6				6.2	4.1	2.4	12.2	94	4				73	3	2
	1545	12/13	0.5				6.2	3.7	1.7	13.4	94	1				68	3	1
	1598	12/27	0.5				6.3	4.7	3.1	14.0	96	0				80	12	3
AVG.			1.1	53	19.8	13.7	6.44	5.92	4.19	11.7	95	7	71	51	0.58	88	41	32
MAX.			2.5	85	23.7	16.0	6.7	8.3	7.0	14.0	112	15	77	59	0.93	103	450	450
MIN.			0.4	33	17.5	11.9	6.1	3.0	1.1	8.8	87	0	63	43	0.38	58	0	0

QUABBIN LABORATORY RECORDS 1993
WARE RIVER AND TRIBUTARIES
(102) PARKER BROOK--NEAR MOUTH

REVET ANALYSIS

DATE SAMP	KJELDAHL -N	AMMONIA -N	NIT-RITE -N	NIT-RATE -N	ORTHO PHOS-PHORUS	TOTAL PHOS-PHORUS	ALUM-INUM	CAD-MIUM	COP-PER	NICKEL	LEAD	ZINC	IRON	CAL-CIUM	ARSENIC	MERCURY	CHRO-MIUM	MANG-ANESE
06/01	0.63	<0.05	<0.01	<0.1	<0.01	0.26	0.112	<0.004	<0.003	<0.03	0.001	0.003	0.975	3.21	<0.004	<0.0002	<0.009	0.029

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NO DATA

4.3 QUABBIN RESERVOIR WATER QUALITY DATA

QUABBIN LABORATORY RECORDS 1993
(202) WINSOR DAM---RESERVOIR

SAMP NO.	DATE SAMP	DEPTH M	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL
394	05/26	0.0											RES. ELEV. 529.68				0	0
395	"	1.0	0.3	5	4.9	8.6	6.85	4.6	2.8	10.26	101	15.14	29	17	0.02	42		
396	"	2.0					6.89			10.27	101	15.08				42		
397	"	3.0					6.89			10.31	102	15.01				42		
398	"	4.0					6.90			10.38	102	14.92				42		
399	"	5.0					6.90			10.48	102	14.75				42		
400	"	6.0					6.91			10.68	104	14.38				42		
401	"	7.0					6.91			10.80	104	14.13				42		
402	"	8.0					6.94			11.14	106	13.36				42		
403	"	9.0					6.97			11.60	108	12.30				42		
404	"	10.0					6.97			11.78	108	11.57				42		
405	"	11.0					7.00			12.20	109	10.55				42		
406	"	12.0					7.03			12.62	110	9.35				42		
407	"	13.0					7.05			12.73	110	8.88				42		
408	"	14.0					7.05			12.79	109	8.36				42		
409	"	15.0					7.03			12.92	109	7.77				42		
410	"	16.0					7.02			12.94	108	7.54				42		
411	"	17.0					6.94			12.90	108	7.26				42		
412	"	18.0					6.91			12.87	106	7.08				42		
413	"	19.0					6.86			12.87	106	6.95				42		
414	"	20.0					6.81			12.82	106	6.82				42		
415	"	21.0					6.76			12.72	104	6.69				42		
416	"	22.0					6.71			12.63	103	6.43				42		
417	"	23.0					6.68			12.56	102	6.33				42		
418	"	24.0					6.64			12.55	102	6.27				42		
419	"	25.0					6.62			12.57	101	6.22				42		
420	"	26.0					6.60			12.55	101	6.10				42		
421	"	27.0					6.58			12.52	101	6.08				42		
422	"	28.0					6.56			12.50	100	6.04				42		
423	"	29.0					6.56			12.50	100	6.02				42		
424	"	30.0					6.55			12.49	100	5.96				42		
425	"	31.0					6.54			12.47	100	5.90				42		
426	"	32.0					6.52			12.45	100	5.84				42		
427	"	33.0					6.52			12.45	99	5.71				41		
428	"	34.0					6.51			12.40	98	5.71				41		
429	"	35.0					6.48			12.32	98	5.56				41		
430	"	36.0					6.45			12.24	97	5.53				41		
431	"	37.0					6.44			12.20	97	5.49				41		
432	"	38.0					6.42			12.16	96	5.44				41		
433	"	39.0					6.42			12.13	96	5.41				41		
434	"	40.0					6.41			12.14	96	5.39				41		
435	"	41.0					6.41			12.10	96	5.37				41		
436	"	42.0					6.38			12.05	95	5.36				41		
437	"	43.0					6.37			12.05	95	5.33				41		
438	"	44.0	0.3	5	5.0	10.1	6.37	3.8	2.0	12.00	95	5.33	29	18	0.02	41		
439	"	45.0					6.37			11.86	94	5.32				41		
	BOTTOM	45.2	HYDROLAB USED FOR -- pH, DO, TEMP., AND COND.															
546	06/16	0.0											RES. ELEV. 529.41				0	0
REVET 547	"	1.0	0.3	5	5.8	8.1	6.89	4.5	2.7	9.92	101	16.65	30	19	0.02	42		
548	"	2.0					6.89			9.98	102	16.54				42		
549	"	3.0					6.93			10.10	102	16.24				43		
550	"	4.0					6.93			10.20	103	15.88				43		
551	"	5.0					6.93			10.29	102	15.59				42		
552	"	6.0					6.94			10.37	103	15.31				42		

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QUABBIN LABORATORY RECORDS 1993

(202) WINSOR DAM---RESERVOIR

REVET ANALYSIS

DATE SAMP	KJELDAHL -N	AMMONIA -N	NIT-RITE -N	NIT-RATE -N	ORTHO PHOS-PHORUS	TOTAL PHOS-PHORUS	ALUM-INUM	CAD-MIUM	COP-PER	NICKEL	LEAD	ZINC	IRON	CAL-CIUM	ARSENIC	MERCURY	CHRO-MIUM	MANG-ANESE
06/16	0.93	<0.05	<0.01	0.17	<0.01	0.03	<0.02	<0.004	0.003	<0.03	<0.001	0.004	0.013	2.08	<0.004	<0.0002	<0.009	0.001

CONTINUED

QUABBIN LABORATORY RECORDS 1993
(202) WINSOR DAM---RESERVOIR

SAMP NO.	DATE SAMP	DEPTH M	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL
553	06/16	7.0					6.93			10.43	103	15.13				42		
554	"	8.0					6.93			10.47	103	14.97				42		
555	"	9.0					6.93			10.57	104	14.80				42		
556	"	10.0					6.92			10.59	103	14.70				43		
557	"	11.0					6.93			10.78	104	14.24				43		
558	"	12.0					6.95			11.19	106	13.02				43		
559	"	13.0					6.96			11.42	107	12.44				43		
560	"	14.0					6.96			11.58	107	11.90				43		
561	"	15.0					6.94			11.64	106	11.58				43		
562	"	16.0					6.98			11.90	109	11.29				43		
563	"	17.0					6.99			12.20	108	10.01				43		
564	"	18.0					6.96			12.22	107	9.43				43		
565	"	19.0					6.93			12.38	108	9.27				43		
566	"	20.0					6.92			12.57	107	8.75				43		
567	"	21.0					6.92			12.55	107	8.54				43		
568	"	22.0					6.88			12.42	106	8.40				43		
569	"	23.0					6.84			12.48	107	8.30				43		
570	"	24.0					6.80			12.31	104	8.07				42		
571	"	25.0					6.74			12.30	104	7.97				42		
572	"	26.0					6.71			12.27	104	7.83				42		
573	"	27.0					6.68			12.28	102	7.66				42		
574	"	28.0					6.64			12.33	103	7.40				42		
575	"	29.0					6.60			12.30	101	7.08				43		
576	"	30.0					6.58			12.22	101	6.81				43		
577	"	31.0					6.48			11.98	98	6.47				42		
578	"	32.0					6.44			11.89	97	6.35				43		
579	"	33.0					6.42			11.87	97	6.29				43		
580	"	34.0					6.40			11.86	95	6.21				43		
581	"	35.0					6.40			11.85	95	6.15				43		
582	"	36.0					6.38			11.86	95	6.11				43		
583	"	37.0					6.38			11.82	95	6.10				43		
584	"	38.0					6.37			11.80	95	6.05				43		
585	"	39.0					6.35			11.76	94	6.03				43		
586	"	40.0					6.35			11.71	94	5.99				43		
587	"	41.0					6.34			11.66	94	5.97				43		
588	"	42.0					6.32			11.66	94	5.97				43		
589	"	43.0					6.32			11.66	94	5.98				43		
REVET 590	"	44.0	0.3	5	5.9	9.0	6.32	3.9	2.1	11.64	93	5.97	31	21	0.02	43		
591	"	45.0					6.31			11.57	93	5.93				43		
	BOTTOM	45.5	HYDROLAB USED FOR -- pH, DO, TEMP., AND COND.															
705	07/14	0.0											RES. ELEV. 528.16				0	0
706	"	1.0					6.86			8.02	95	24.50				44		
707	"	2.0					6.85			8.03	95	24.47				44		
708	"	3.0	0.3	5	5.1	8.6	6.87	4.1	2.7	8.07	95	24.37	29	17	0.03	44		
709	"	4.0					6.87			8.09	95	24.25				44		
710	"	5.0					6.87			8.10	95	24.20				44		
711	"	6.0					6.87			8.10	95	24.17				44		
712	"	7.0					6.94			8.95	101	22.22				44		
713	"	8.0					6.99			9.22	103	21.57				44		
714	"	9.0					7.01			9.46	104	20.32				44		
715	"	10.0					7.08			9.82	105	18.80				44		
716	"	11.0					7.12			10.11	106	17.78				43		
717	"	12.0					7.17			10.68	105	15.22				43		
718	"	13.0					7.20			11.18	107	13.30				43		

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QUABBIN LABORATORY RECORDS 1993
(202) WINSOR DAM---RESERVOIR REVET ANALYSIS

DATE SAMP	KJELDAHL -N	AMMONIA -N	NIT-RITE -N	NIT-RATE -N	ORTHO PHOS-PHORUS	TOTAL PHOS-PHORUS	ALUM-INUM	CAD-MIUM	COP-PER	NICKEL	LEAD	ZINC	IRON	CAL-CIUM	ARSENIC	MERCURY	CHRO-MIUM	MANG-ANESE
06/16	0.54	<0.05	<0.01	0.19	<0.01	<0.01	0.022	<0.004	<0.003	<0.03	<0.001	<0.003	0.061	2.15	<0.004	<0.0002	<0.009	0.018

QUABBIN LABORATORY RECORDS 1993
(202) WINSOR DAM---RESERVOIR

SAMP NO.	DATE SAMP	DEPTH M	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL
719	07/14	14.0					7.21			11.28	105	12.38				43		
720	"	15.0					7.20			11.69	106	11.20				43		
721	"	16.0					7.19			11.74	105	10.67				43		
722	"	17.0					7.15			11.60	104	10.37				43		
723	"	18.0					7.07			11.60	102	9.94				43		
724	"	19.0					6.96			11.50	101	9.52				43		
725	"	20.0					6.89			11.46	100	9.37				43		
726	"	21.0					6.81			11.35	98	9.03				43		
727	"	22.0					6.72			11.33	98	8.91				43		
728	"	23.0					6.69			11.33	97	8.65				43		
729	"	24.0					6.64			11.30	97	8.51				43		
730	"	25.0					6.61			11.24	96	8.36				43		
731	"	26.0					6.57			11.18	94	8.23				43		
732	"	27.0					6.54			11.18	94	8.01				43		
733	"	28.0	0.3	5	5.5	8.1	6.50	3.7	2.3	11.17	94	7.80	28	18	0.02	43		
734	"	29.0					6.40			11.02	92	7.48				43		
735	"	30.0					3.38			10.95	91	7.40				43		
736	"	31.0					6.35			10.89	91	7.32				43		
737	"	32.0					6.33			10.72	88	7.07				43		
738	"	33.0					6.31			10.70	88	7.03				43		
739	"	34.0					6.30			10.65	88	6.91				43		
740	"	35.0					6.28			10.60	87	6.88				43		
741	"	36.0					6.26			10.58	87	6.84				43		
742	"	37.0					6.25			10.59	87	6.84				43		
743	"	38.0					6.25			10.59	87	6.79				43		
744	"	39.0					6.24			10.58	86	6.74				43		
745	"	40.0					6.23			10.52	86	6.73				43		
746	"	41.0					6.23			10.51	86	6.69				43		
	BOTTOM	41.8	HYDROLAB USED FOR -- pH, DO, TEMP., AND COND.															
860	08/11	0.0											RES. ELEV. 526.86				0	0
861	"	1.0					6.75			8.16	94	23.18				43		
862	"	2.0					6.75			8.19	94	23.17				43		
863	"	3.0					6.80			8.22	95	23.16				43		
864	"	4.0					6.81			8.23	95	23.15				43		
865	"	5.0	0.3	5	5.2	7.8	6.82	4.0	2.7	8.28	95	22.99	29	17	0.03	43		
866	"	6.0					6.83			8.41	97	22.86				43		
867	"	7.0					6.84			8.53	97	22.63				43		
868	"	8.0					6.84			8.60	98	22.41				43		
869	"	9.0					6.85			8.74	99	22.00				43		
870	"	10.0					6.86			8.84	99	21.62				43		
871	"	11.0					6.88			9.33	103	20.54				43		
872	"	12.0					6.93			10.24	109	18.70				43		
873	"	13.0					7.00			10.58	106	16.21				43		
874	"	14.0					7.05			11.04	109	15.07				43		
875	"	15.0					7.08			11.25	109	13.82				43		
876	"	16.0					7.10			11.63	109	12.39				43		
877	"	17.0					7.11			11.65	108	11.80				43		
878	"	18.0					7.09			11.73	106	11.11				43		
879	"	19.0					7.06			11.66	104	10.62				42		
880	"	20.0					6.97			11.45	101	10.22				42		
881	"	21.0					6.85			11.25	99	9.90				42		
882	"	22.0					6.74			11.11	97	9.67				42		
883	"	23.0					6.66			10.99	96	9.48				42		
884	"	24.0					6.58			10.95	96	9.33				43		

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QUABBIN LABORATORY RECORDS 1993
(202) WINSOR DAM---RESERVOIR

SAMP NO.	DATE SAMP	DEPTH M	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL
885	08/11	25.0					6.49			10.91	94	9.17				42		
886	"	26.0					6.44			10.75	93	8.92				43		
887	"	27.0					6.41			10.79	92	8.68				43		
888	"	28.0					6.36			10.73	92	8.51				42		
889	"	29.0					6.34			10.71	92	8.40				42		
890	"	30.0	0.3	5	5.5	7.7	6.31	3.6	2.4	10.45	88	8.20	29	18	0.02	42		
891	"	31.0					6.28			10.42	88	7.94				43		
892	"	32.0					6.26			10.34	87	7.84				43		
893	"	33.0					6.23			10.19	85	7.63				43		
894	"	34.0					6.18			10.15	85	7.40				43		
895	"	35.0					6.16			10.06	84	7.32				43		
896	"	36.0					6.15			10.04	83	7.22				43		
897	"	37.0					6.14			9.92	82	7.16				43		
898	"	38.0					6.12			9.75	80	7.08				43		
899	"	39.0					6.09			9.67	80	7.03				43		
900	"	40.0					6.09			9.60	79	6.98				43		
901	"	41.0					6.09			9.53	79	6.97				43		
902	"	42.0					6.08			9.35	77	6.95				43		
	BOTTOM 42.7 M		HYDROLAB USED FOR -- pH, DO, TEMP., AND COND.															
1030	09/15	0.0											RES. ELEV. 525.21				0	0
1031	"	1.0					6.73			8.37	94	21.30				43		
1032	"	2.0					6.76			8.40	94	21.28				43		
1033	"	3.0	0.3	5	5.3	9.3	6.78	4.0	2.8	8.40	94	21.28	26	15	0.03	43		
1034	"	4.0					6.78			8.40	94	21.28				43		
1035	"	5.0					6.79			8.40	94	21.28				43		
1036	"	6.0					6.79			8.41	94	21.25				43		
1037	"	7.0					6.80			9.10	100	20.65				43		
1038	"	8.0					6.79			9.42	102	19.34				43		
1039	"	9.0					6.76			9.55	102	18.95				43		
1040	"	10.0					6.73			9.77	104	18.60				43		
1041	"	11.0					6.74			10.30	106	17.15				43		
1042	"	12.0					6.75			10.69	108	15.94				43		
1043	"	13.0					6.78			10.86	108	15.26				44		
1044	"	14.0					6.82			11.18	108	14.12				43		
1045	"	15.0					6.80			11.12	105	13.22				43		
1046	"	16.0					6.76			11.37	105	12.10				43		
1047	"	17.0					6.72			11.28	103	11.39				43		
1048	"	18.0					6.65			11.10	100	10.91				43		
1049	"	19.0					6.56			10.89	97	10.53				43		
1050	"	20.0					6.50			10.77	96	10.29				43		
1051	"	21.0					6.43			10.64	94	10.06				43		
1052	"	22.0					6.40			10.43	92	9.81				43		
1053	"	23.0					6.35			10.42	91	9.64				43		
1054	"	24.0					6.31			10.31	90	9.52				43		
1055	"	25.0					6.29			10.22	89	9.39				43		
1056	"	26.0					6.26			10.11	87	9.23				43		
1057	"	27.0					6.23			9.90	86	9.01				43		
1058	"	28.0					6.22			9.85	85	8.79				43		
1059	"	29.0					6.17			9.50	81	8.49				43		
1060	"	30.0	0.3	5	5.8	10.3	6.14	3.6	2.4	9.46	81	8.28	29	19	0.03	43		
1061	"	31.0					6.11			9.45	80	8.18				43		
1062	"	32.0					6.08			9.28	78	7.98				43		
1063	"	33.0					6.07			9.21	78	7.86				43		
1064	"	34.0					6.05			8.94	75	7.70				43		

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QUABBIN LABORATORY RECORDS 1993
(202) WINSOR DAM---RESERVOIR

SAMP NO.	DATE SAMP	DEPTH M	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL
1065	09/15	35.0					6.03			8.84	74	7.60				43		
1066	"	36.0					6.02			8.79	73	7.57				44		
1067	"	37.0					6.02			8.71	73	7.52				44		
1068	"	38.0					5.99			8.60	72	7.45				43		
1069	"	39.0					5.98			8.41	70	7.40				43		
1070	"	40.0					5.97			8.26	69	7.31				43		
1071	"	41.0					5.97			8.17	68	7.28				43		
1072	"	42.0					5.95			8.01	66	7.25				44		
1073	"	43.0					5.94			7.91	65	7.24				43		
1074	"	44.0					5.93			7.85	65	7.23				44		
	BOTTOM	44.2		HYDROLAB USED FOR -- pH, DO, TEMP., AND COND.														
1166	10/06	0.0											RES. ELEV. 524.81				3	1
1167	"	1.0					6.58			9.01	92	16.32				44		
1168	"	2.0					6.59			9.03	92	16.27				44		
1169	"	3.0					6.63			9.04	91	16.23				44		
1170	"	4.0					6.64			9.04	91	16.23				43		
1171	"	5.0					6.65			9.08	91	16.21				43		
1172	"	6.0					6.66			9.08	91	16.19				43		
1173	"	7.0					6.66			9.08	91	16.18				43		
1174	"	8.0	0.3	5	6.5	10.3	6.68	4.3	2.5	9.09	91	16.17	28	18	0.02	43		
1175	"	9.0					6.67			9.08	91	16.17				43		
1176	"	10.0					6.67			9.08	91	16.16				44		
1177	"	11.0					6.69			9.08	91	16.14				43		
1178	"	12.0					6.69			9.08	91	16.14				43		
1179	"	13.0					6.69			9.09	91	16.12				43		
1180	"	14.0					6.70			9.09	91	16.12				44		
1181	"	15.0					6.70			9.09	91	16.11				44		
1182	"	16.0					6.46			8.95	88	15.00				44		
1183	"	17.0					6.36			9.37	89	13.50				44		
1184	"	18.0					6.25			9.40	88	12.31				44		
1185	"	19.0					6.23			9.41	87	11.77				44		
1186	"	20.0					6.22			9.47	86	11.23				44		
1187	"	21.0					6.19			9.47	86	11.06				44		
1188	"	22.0					6.18			9.46	86	10.83				44		
1189	"	23.0					6.18			9.45	84	10.64				44		
1190	"	24.0					6.16			9.37	84	10.57				44		
1191	"	25.0					6.16			9.35	84	10.34				44		
1192	"	26.0					6.14			9.35	83	10.20				44		
1193	"	27.0					6.15			9.29	82	10.01				44		
1194	"	28.0					6.13			9.29	82	9.92				44		
1195	"	29.0					6.13			9.28	81	9.73				44		
1196	"	30.0	0.3	5	6.0	10.2	6.12	4.3	2.4	9.14	80	9.43	27	19	0.03	44		
1197	"	31.0					6.11			9.10	79	9.20				44		
1198	"	32.0					6.09			8.93	77	8.93				44		
1199	"	33.0					6.07			8.89	77	8.82				44		
1200	"	34.0					6.06			8.76	75	8.66				44		
1201	"	35.0					6.05			8.65	74	8.44				44		
1202	"	36.0					6.02			8.46	71	8.21				44		
1203	"	37.0					6.01			8.41	71	8.10				44		
1204	"	38.0					6.00			8.34	70	8.09				44		
1205	"	39.0					5.99			8.18	69	7.88				44		
1206	"	40.0					5.97			8.07	68	7.77				44		
1207	"	41.0					5.96			8.03	67	7.75				44		
1208	"	42.0					5.95			8.00	67	7.70				44		

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QUABBIN LABORATORY RECORDS 1993
(202) WINSOR DAM---RESERVOIR

SAMP NO.	DATE SAMP	DEPTH M	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL
1209	10/06	43.0					5.95			7.91	66	7.67				44		
	BOTTOM	43.5	HYDROLAB USED FOR -- pH, DO, TEMP., AND COND.															
1327	11/03	0.0											RES. ELEV. 524.10				5	1
1328	"	1.0	0.3	5	6.2	8.8	6.48	4.5	2.9	9.45	87	12.17	29	20	0.04	45		
1329	"	3.0					6.51			9.45	87	12.05				44		
1330	"	6.0					6.52			9.46	87	12.04				44		
1331	"	9.0					6.54			9.48	88	11.99				44		
1332	"	12.0					6.55			9.51	88	11.97				44		
1333	"	15.0					6.54			9.50	88	11.90				44		
1334	"	18.0					6.53			9.50	88	11.87				44		
1335	"	21.0					6.52			9.50	88	11.84				44		
1336	"	24.0					6.51			9.47	87	11.83				44		
1337	"	27.0					6.50			9.42	86	11.73				44		
1338	"	30.0					6.07			7.69	68	10.08				44		
1339	"	33.0					5.98			7.70	67	9.50				44		
1340	"	36.0					5.98			7.63	66	9.11				44		
1341	"	39.0	0.3	5	6.4	9.2	5.96	4.4	2.4	7.35	63	8.75	30	22	0.04	44		
	BOTTOM	40.4																
AVG.			0.3	5	5.7	9.0	6.55	4.09	2.51	10.38	94	11.18	29	18	0.03	43	1	0
MAX.			0.3	5	6.5	10.3	7.21	4.6	2.9	12.94	110	24.50	31	22	0.04	45	5	1
MIN.			0.3	5	4.9	7.7	3.38	3.6	2.0	7.35	63	5.32	26	15	0.02	41	0	0

QUABBIN LABORATORY RECORDS 1993
(206) SHAFT #12---RESERVOIR

SAMP NO.	DATE SAMP	DEPTH M	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL
440	05/26	0.0											RES. ELEV. 529.68				0	0
441	"	1.0	0.3	5	5.2	11.0	6.85	4.4	2.7	10.25	101	15.25	28	15	0.02	41		
442	"	2.0					6.89			10.25	101	15.25				41		
443	"	3.0					6.89			10.25	101	15.23				41		
444	"	4.0					6.89			10.26	101	15.23				41		
445	"	5.0					6.89			10.27	101	15.23				41		
446	"	6.0					6.89			10.26	101	15.19				42		
447	"	7.0					6.88			10.29	101	15.14				42		
448	"	8.0					6.96			11.08	103	12.43				42		
449	"	9.0					7.01			12.59	108	8.57				42		
450	"	10.0					6.98			12.59	108	8.26				42		
451	"	11.0					6.93			12.62	107	7.92				42		
452	"	12.0					6.89			12.57	105	7.48				42		
453	"	13.0					6.82			12.54	105	7.31				42		
454	"	14.0					6.77			12.53	103	7.22				42		
455	"	15.0					6.73			12.50	103	7.13				42		
456	"	16.0					6.71			12.50	103	7.04				42		
457	"	17.0					6.67			12.46	103	7.02				42		
458	"	18.0					6.66			12.42	102	7.00				42		
459	"	19.0					6.64			12.36	102	6.92				42		
460	"	20.0					6.61			12.34	102	6.76				42		
461	"	21.0					6.58			12.38	101	6.71				42		
462	"	22.0					6.57			12.36	101	6.66				42		
463	"	23.0					6.57			12.35	101	6.60				42		
464	"	24.0					6.55			12.33	100	6.55				42		
465	"	25.0					6.54			12.33	100	6.53				42		
466	"	26.0					6.53			12.35	101	6.53				42		
467	"	27.0					6.53			12.31	100	6.51				42		
468	"	28.0					6.52			12.30	100	6.48				42		
469	"	29.0	0.3	5	5.0	12.0	6.50	3.8	2.1	12.29	100	6.44	28	16	0.02	42		
470	"	30.0					6.51			12.27	100	6.44				42		
	BOTTOM	30.2	HYDROLAB USED FOR -- pH, DO, TEMP., AND COND.															
592	06/16	0.0											RES. ELEV. 529.41				0	0
REVET 593	"	1.0	0.3	5	5.8	8.9	6.76	4.0	2.2	9.42	100	18.71	30	18	0.02	42		
594	"	2.0					6.86			9.42	100	18.60				42		
595	"	3.0					6.88			9.44	100	18.50				42		
596	"	4.0					6.90			9.50	101	18.43				42		
597	"	5.0					6.90			9.55	100	18.05				43		
598	"	6.0					6.92			9.60	101	17.89				43		
599	"	7.0					6.95			9.72	101	17.33				43		
600	"	8.0					6.97			9.93	101	16.58				43		
601	"	9.0					6.96			11.06	106	13.29				43		
602	"	10.0					6.90			11.77	106	10.86				43		
603	"	11.0					6.85			11.96	106	9.99				43		
604	"	12.0					6.85			12.09	106	9.46				43		
605	"	13.0					6.78			12.09	105	9.11				43		
606	"	14.0					6.73			12.20	106	8.96				43		
607	"	15.0					6.74			12.26	106	8.89				43		
608	"	16.0					6.67			12.20	104	8.36				43		
609	"	17.0					6.63			12.13	104	8.27				43		
610	"	18.0					6.58			12.04	102	8.13				43		
611	"	19.0					6.57			12.09	102	8.10				43		
612	"	20.0					6.55			12.09	102	8.02				43		
613	"	21.0					6.53			12.05	102	8.00				43		

CONTINUED

QUABBIN LABORATORY RECORDS 1993
(206) SHAFT #12---RESERVOIR REVET ANALYSIS

DATE SAMP	KJELDAHL -N	AMMONIA -N	NIT-RITE -N	NIT-RATE -N	ORTHO PHOS-PHORUS	TOTAL PHOS-PHORUS	ALUM-INUM	CAD-MIUM	COP-PER	NICKEL	LEAD	ZINC	IRON	CAL-CIUM	ARSENIC	MERCURY	CHRO-MIUM	MANG-ANESE
06/16	0.23	<0.05	<0.01	0.11	<0.01	0.03	<0.02	<0.004	<0.003	<0.03	0.012	0.005	0.025	2.06	<0.004	<0.0002	<0.009	0.001

CONTINUED

QUABBIN LABORATORY RECORDS 1993
(206) SHAFT #12---RESERVOIR

	SAMP NO.	DATE SAMP	DEPTH M	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL
	614	06/16	22.0					6.53			12.02	101	7.97				43		
	615	"	23.0					6.50			11.98	101	7.80				43		
	616	"	24.0					6.49			11.88	99	7.71				42		
	617	"	25.0					6.47			11.84	99	7.52				43		
	618	"	26.0					6.43			11.78	98	7.44				42		
REVET	619	"	27.0	0.3	5	5.8	8.2	6.42	3.9	2.1	11.79	98	7.43	31	20	0.02	42		
	620	"	28.0					6.42			11.72	98	7.38				42		
		BOTTOM	28.2	HYDROLAB USED FOR -- pH, DO, TEMP., AND COND.															
	747	07/14	0:0											RES. ELEV. 528.16				1	1
	748	"	1.0					6.64			7.92	93	24.55				43		
	749	"	2.0					6.69			7.94	94	24.43				43		
	750	"	3.0	0.3	5	5.5	8.0	6.74	4.2	2.9	7.96	94	24.44	28	17	0.02	43		
	751	"	4.0					6.78			7.96	94	24.40				43		
	752	"	5.0					6.79			7.99	94	24.35				43		
	753	"	6.0					6.87			8.63	99	23.19				43		
	754	"	7.0					6.93			8.76	100	22.39				43		
	755	"	8.0					6.94			8.97	100	21.71				43		
	756	"	9.0					6.98			9.36	102	19.78				43		
	757	"	10.0					7.04			9.66	102	18.47				43		
	758	"	11.0					7.09			10.37	107	16.89				43		
	759	"	12.0					7.10			10.66	106	15.41				43		
	760	"	13.0					7.07			10.91	106	14.28				43		
	761	"	14.0					7.12			11.35	107	13.01				43		
	762	"	15.0					7.17			12.00	110	11.65				43		
	763	"	16.0					7.18			11.80	108	11.40				43		
	764	"	17.0					7.16			11.60	105	10.89				43		
	765	"	18.0					6.98			11.45	101	10.24				43		
	766	"	19.0					6.86			11.21	99	9.97				43		
	767	"	20.0					6.65			10.89	96	9.90				43		
	768	"	21.0	0.3	5	5.5	9.2	6.56	3.9	2.5	10.77	94	9.34	28	17	0.02	43		
	769	"	22.0					6.49			10.87	94	9.19				43		
	770	"	23.0					6.47			10.64	92	8.94				43		
	771	"	24.0					6.43			10.51	90	8.71				43		
	772	"	25.0					6.37			10.45	89	8.55				43		
	773	"	26.0					6.32			10.41	89	8.49				43		
	774	"	27.0					6.32			10.36	89	8.41				43		
		BOTTOM	27.6	HYDROLAB USED FOR -- pH, DO, TEMP., AND COND.															
	903	08/11	0.0											RES. ELEV. 526.86				0	0
	904	"	1.0					6.67			8.14	94	23.55				42		
	905	"	2.0					6.76			8.17	95	23.52				42		
	906	"	3.0					6.81			8.16	95	23.52				42		
	907	"	4.0					6.83			8.17	95	23.52				42		
	908	"	5.0	0.3	5	5.5	8.2	6.86	3.9	2.6	8.20	95	23.51	29	15	0.02	43		
	909	"	6.0					6.86			8.22	95	23.49				43		
	910	"	7.0					6.88			8.22	95	23.41				43		
	911	"	8.0					6.88			8.21	95	23.30				43		
	912	"	9.0					6.88			8.24	95	23.24				43		
	913	"	10.0					6.98			9.44	104	20.30				43		
	914	"	11.0					7.01			10.09	108	18.81				43		
	915	"	12.0					7.00			10.46	109	17.74				43		
	916	"	13.0					7.06			10.94	110	15.78				43		
	917	"	14.0					7.10			11.33	110	14.38				43		
	918	"	15.0					7.08			11.43	109	13.48				43		

CONTINUED

QUABBIN LABORATORY RECORDS 1993
(206) SHAFT #12---RESERVOIR

REVET ANALYSIS

DATE SAMP	KJELDAHL -N	AMMONIA -N	NIT-RITE -N	NIT-RATE -N	ORTHO PHOS-PHORUS	TOTAL PHOS-PHORUS	ALUM-INUM	CAD-MIUM	COP-PER	NICKEL	LEAD	ZINC	IRON	CAL-CIUM	ARSENIC	MERCURY	CHRO-MIUM	MANG-ANESE
06/16	0.30	<0.05	<0.01	0.20	<0.01	0.04	<0.02	<0.004	<0.003	<0.03	<0.001	0.012	0.020	2.14	<0.004	<0.0002	<0.009	0.004

QUABBIN LABORATORY RECORDS 1993
(206) SHAFT #12---RESERVOIR

SAMP NO.	DATE SAMP	DEPTH M	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL
919	08/11	16.0					7.08			11.50	107	12.41				43		
920	"	17.0					7.02			11.43	104	11.72				43		
921	"	18.0					6.91			11.07	100	11.07				43		
922	"	19.0					6.78			10.91	98	10.68				43		
923	"	20.0					6.65			10.39	93	10.74				43		
924	"	21.0					6.54			10.42	92	9.98				43		
925	"	22.0					6.44			10.19	90	9.79				43		
926	"	23.0					6.38			9.92	87	9.47				43		
927	"	24.0	0.3	5	5.5	8.0	6.27	3.5	2.4	9.66	84	9.15	27	16	0.02	43		
928	"	25.0					6.23			9.52	82	9.12				43		
929	"	26.0					6.20			9.62	83	9.05				43		
930	"	27.0					6.18			9.30	80	8.99				43		
931	"	28.0					6.17			9.52	82	8.90				43		
932	"	29.0					6.16			9.50	82	8.84				43		
933	"	30.0					6.15			9.42	81	8.62				43		
934	"	31.0					6.12			9.05	77	8.30				43		
	BOTTOM	31.5 M	HYDROLAB USED FOR -- pH, DO, TEMP., AND COND.													43		
1075	09/15	0.0											RES. ELEV. 525.21				1	0
1076	"	1.0					6.72			8.25	92	21.38				44		
1077	"	2.0					6.72			8.26	93	21.38				44		
1078	"	3.0					6.74			8.26	93	21.37				43		
1079	"	4.0					6.75			8.27	93	21.37				44		
1080	"	5.0					6.75			8.27	93	21.37				44		
1081	"	6.0					6.75			8.27	93	21.37				43		
1082	"	7.0					6.76			8.29	93	21.37				44		
1083	"	8.0	0.3	5	6.2	9.9	6.78	3.8	2.8	8.36	94	21.35	28	15	0.03	43		
1084	"	9.0					6.78			8.32	93	21.35				43		
1085	"	10.0					6.78			8.30	93	21.35				43		
1086	"	11.0					6.78			8.30	93	21.35				43		
1087	"	12.0					6.78			8.30	93	21.35				43		
1088	"	13.0					6.78			8.30	93	21.35				43		
1089	"	14.0					6.78			8.30	93	21.35				44		
1090	"	15.0					6.78			8.30	93	21.30				44		
1091	"	16.0					6.65			10.08	97	13.90				43		
1092	"	17.0					6.52			10.30	97	13.05				43		
1093	"	18.0					6.46			10.23	96	12.61				44		
1094	"	19.0					6.37			10.07	93	11.88				43		
1095	"	20.0					6.25			9.53	86	11.13				43		
1096	"	21.0					6.19			9.26	83	10.60				44		
1097	"	22.0	0.3	5	6.2	10.2	6.14	3.5	2.5	9.08	81	10.40	29	17	0.03	44		
1098	"	23.0					6.11			8.95	79	10.18				43		
1099	"	24.0					6.08			8.80	78	9.96				43		
1100	"	25.0					6.06			8.79	78	9.87				43		
1101	"	26.0					6.05			8.56	75	9.75				43		
	BOTTOM	26.4	HYDROLAB USED FOR -- pH, DO, TEMP., AND COND.															
1210	10/06	0.0															0	0
1211	"	1.0					6.61			9.05	91	15.87				43		
1212	"	2.0					6.61			9.05	91	15.88				43		
1213	"	3.0					6.61			9.06	91	15.89				44		
1214	"	4.0					6.61			9.07	91	15.89				44		
1215	"	5.0					6.61			9.07	91	15.89				44		
1216	"	6.0					6.61			9.07	91	15.88				44		
1217	"	7.0					6.62			9.07	91	15.88				44		

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QUABBIN LABORATORY RECORDS 1993
(206) SHAFT #12---RESERVOIR

SAMP NO.	DATE SAMP	DEPTH M	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL
1218	10/06	8.0					6.62			9.07	91	15.88				44		
1219	"	9.0	0.3	5	6.1	8.3	6.62	4.4	2.5	9.06	91	15.90	27	16	0.03	44		
1220	"	10.0					6.62			9.06	91	15.90				44		
1221	"	11.0					6.63			9.06	91	15.90				44		
1222	"	12.0					6.63			9.06	91	15.90				44		
1223	"	13.0					6.63			9.04	91	15.90				44		
1224	"	14.0					6.62			9.04	91	15.88				44		
1225	"	15.0					6.62			9.02	91	15.88				44		
1226	"	16.0					6.61			9.00	91	15.83				44		
1227	"	17.0					6.59			8.97	90	15.83				44		
1228	"	18.0					6.58			8.96	90	15.82				44		
1229	"	19.0					6.40			8.53	82	14.00				44		
1230	"	20.0					6.20			8.18	76	12.31				44		
1231	"	21.0					6.07			8.10	74	11.52				44		
1232	"	22.0					6.03			8.05	73	11.16				44		
1233	"	23.0					6.00			8.00	72	10.94				44		
1234	"	24.0	0.3	5	6.3	9.8	5.98	4.5	2.7	7.96	72	10.76	26	17	0.06	44		
1235	"	25.0					5.96			7.93	71	10.72				44		
1236	"	26.0					5.95			7.93	71	10.61				44		
	BOTTOM	26.3																
1342	11/03	0.0											RES. ELEV. 524.10				1	0
1343	"	1.0	0.3	5	6.5	10.0	6.45	4.4	2.6	9.68	88	11.22	29	18	0.04	45		
1344	"	3.0					6.47			9.71	88	11.23				45		
1345	"	6.0					6.47			9.71	88	11.23				45		
1346	"	9.0					6.48			9.71	88	11.23				45		
1347	"	12.0					6.50			9.72	88	11.23				45		
1348	"	15.0					6.50			9.72	88	11.23				45		
1349	"	18.0					6.50			9.72	88	11.22				45		
1350	"	21.0					6.50			9.72	88	11.22				44		
1351	"	24.0	0.3	5	6.5	10.0	6.49	4.3	2.3	9.72	88	11.20	30	20	0.04	44		
	BOTTOM	25.5																
AVG.			0.3	5	5.8	9.4	6.65	4.04	2.49	10.08	95	13.52	28	17	0.03	43	0	0
MAX.			0.3	5	6.5	12.0	7.18	4.5	2.9	12.62	110	24.55	31	20	0.06	45	1	1
MIN.			0.3	5	5.0	8.0	5.95	3.5	2.1	7.92	71	6.44	26	15	0.02	41	0	0

HYDROLAB USED FOR -- pH, DO, TEMP., AND COND.

QUABBIN LABORATORY RECORDS 1993
DEN HILL---(RESERVOIR)

	SAMP NO.	DATE SAMP	DEPTH M	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL
	471	05/26	0.0											RES. ELEV. 529.68				0	0
	472	"	1.0	0.3	7	6.0	10.4	6.84	4.5	3.0	9.85	100	16.59	30	17	0.03	43		
	473	"	2.0					6.87			9.89	101	16.58				43		
	474	"	3.0					6.85			9.93	101	16.46				43		
	475	"	4.0					6.84			9.94	101	16.40				43		
	476	"	5.0					6.83			9.94	101	16.30				43		
	477	"	6.0					6.67			10.78	107	15.32				44		
	478	"	7.0					6.57			10.86	101	12.30				43		
	479	"	8.0					6.48			10.80	97	10.70				44		
	480	"	9.0					6.39			10.90	97	10.28				44		
	481	"	10.0					6.30			10.60	93	9.53				44		
	482	"	11.0					6.24			10.51	91	9.20				45		
	483	"	12.0					6.21			10.48	90	8.60				45		
	484	"	13.0					6.21			10.47	88	8.23				45		
	485	"	14.0					6.19			10.47	88	8.01				45		
	486	"	15.0					6.17			10.46	88	7.92				46		
	487	"	16.0					6.17			10.52	89	7.78				45		
	488	"	17.0					6.17			10.52	88	7.62				45		
	489	"	18.0					6.16			10.49	87	7.51				45		
	490	"	19.0	0.3	10	6.0	14.3	6.14	3.8	2.0	10.44	87	7.41	33	19	0.05	45		
	491	"	20.0					6.14			10.34	86	7.26				45		
		BOTTOM	20.2	HYDROLAB USED FOR -- pH, DO, TEMP., AND COND.															
	621	06/16	0.0											RES. ELEV. 529.41				0	0
REVET	622	"	1.0	0.3	8	7.0	9.1	6.82	4.5	3.0	9.19	100	20.19	33	20	0.03	43		
	623	"	2.0					6.88			9.28	100	19.57				43		
	624	"	3.0					6.94			9.51	101	18.69				43		
	625	"	4.0					6.93			9.52	101	18.41				44		
	626	"	5.0					6.95			9.62	102	18.28				44		
	627	"	6.0					6.96			9.72	102	17.76				43		
	628	"	7.0					6.97			9.83	102	17.44				44		
	629	"	8.0					6.93			9.89	102	16.85				44		
	630	"	9.0					6.90			9.90	100	16.16				44		
	631	"	10.0					6.61			9.29	91	14.29				44		
	632	"	11.0					6.34			9.27	85	11.46				45		
	633	"	12.0					6.22			9.42	85	10.81				45		
	634	"	13.0					6.18			9.30	83	10.51				46		
	635	"	14.0					6.14			9.29	81	9.31				46		
	636	"	15.0					6.10			9.20	80	9.10				45		
	637	"	16.0					6.08			9.31	81	8.93				46		
	638	"	17.0					6.08			9.36	80	8.75				46		
REVET	639	"	18.0	0.3	10	7.0	8.2	6.06	4.4	2.7	9.31	80	8.51	35	23	0.04	46		
	640	"	19.0					6.06			9.07	78	8.28				46		
		BOTTOM	19.6	HYDROLAB USED FOR -- pH, DO, TEMP., AND COND.															
	775	07/14	0.0											RES. ELEV. 528.16				0	0
	776	"	1.0					6.70			7.78	93	25.43				44		
	777	"	2.0					6.70			7.80	94	25.38				44		
	778	"	3.0	0.3	5	5.7	8.3	6.76	4.1	2.9	7.84	93	25.13	29	17	0.03	44		
	779	"	4.0					6.79			7.88	94	25.00				44		
	780	"	5.0					6.79			7.87	94	24.94				44		
	781	"	6.0					6.86			8.57	99	23.64				44		
	782	"	7.0					6.93			8.94	101	22.00				44		
	783	"	8.0					6.92			9.06	100	20.67				44		
	784	"	9.0					6.92			9.21	100	19.77				44		

CONTINUED

QUABBIN LABORATORY RECORDS 1993

DEN HILL---(RESERVOIR) REVET ANALYSIS

DATE SAMP	KJELDAHL -N	AMMONIA -N	NIT-RITE -N	NIT-RATE -N	ORTHO PHOS-PHORUS	TOTAL PHOS-PHORUS	ALUM-INUM	CAD-MIUM	COP-PER	NICKEL	LEAD	ZINC	IRON	CAL-CIUM	ARSENIC	MERCURY	CHRO-MIUM	MANG-ANESE
06/16	0.74	<0.05	<0.01	0.14	<0.01	0.01	0.049	<0.004	<0.003	<0.03	<0.001	<0.003	0.047	2.23	<0.004	<0.0002	<0.009	0.005
06/16	0.70	<0.05	<0.01	0.17	<0.01	0.06	0.043	<0.004	<0.003	<0.03	<0.001	0.003	0.085	2.20	<0.004	<0.0002	<0.009	0.010

QUABBIN LABORATORY RECORDS 1993
DEN HILL---(RESERVOIR)

SAMP NO.	DATE SAMP	DEPTH M	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL
785	07/14	10.0					6.91			9.55	100	18.10				44		
786	"	11.0					6.93			9.70	100	16.91				44		
787	"	12.0					6.71			9.39	91	13.98				44		
788	"	13.0					6.26			7.73	71	12.23				44		
789	"	14.0					6.13			7.23	66	11.37				45		
790	"	15.0	0.4	7	6.0	9.0	6.02	4.0	2.7	7.00	63	10.50	32	20	0.04	46		
791	"	16.0					5.98			7.11	63	9.77				46		
792	"	17.0					5.95			6.84	60	9.35				46		
793	"	18.0					5.94			6.83	59	8.97				46		
794	"	19.0					5.94			6.89	60	8.82				46		
	BOTTOM	19.1		HYDROLAB USED FOR -- pH, DO, TEMP., AND COND.														
935	08/11	0.0											RES. ELEV. 526.86				0	0
936	"	1.0					6.77			8.10	95	24.09				43		
937	"	2.0					6.77			8.13	95	23.95				43		
938	"	3.0					6.81			8.13	95	23.95				43		
939	"	4.0					6.82			8.12	95	23.90				43		
940	"	5.0	0.3	5	5.5	9.0	6.83	4.1	2.9	8.12	95	23.77	30	16	0.03	43		
941	"	6.0					6.83			8.15	95	23.67				43		
942	"	7.0					6.81			8.17	95	23.64				43		
943	"	8.0					6.80			8.17	95	23.55				43		
944	"	9.0					6.80			8.21	94	22.86				43		
945	"	10.0					6.76			8.31	94	22.00				43		
946	"	11.0					6.70			8.62	95	20.59				43		
947	"	12.0					6.70			9.44	101	19.11				43		
948	"	13.0					6.51			8.83	89	15.80				44		
949	"	14.0					6.31			8.34	80	13.92				45		
950	"	15.0					5.95			5.25	48	11.92				45		
951	"	16.0	0.4	10	6.0	9.4	5.89	3.8	2.5	5.52	49	10.53	33	20	0.10	46		
952	"	17.0					5.86			5.16	46	10.09				46		
953	"	18.0					5.85			4.75	42	9.71				46		
	BOTTOM	18.6 M		HYDROLAB USED FOR -- pH, DO, TEMP., AND COND.														
1102	09/15	0.0											RES. ELEV. 525.21				1	0
1103	"	1.0					6.68			8.06	90	21.75				44		
1104	"	2.0					6.67			8.07	90	21.70				44		
1105	"	3.0					6.66			8.09	91	21.66				44		
1106	"	4.0					6.66			8.10	91	21.57				44		
1107	"	5.0					6.66			8.11	91	21.56				44		
1108	"	6.0	0.3	5	7.1	10.2	6.66	3.7	2.7	8.10	91	21.52	29	15	0.03	44		
1109	"	7.0					6.66			8.10	91	21.51				44		
1110	"	8.0					6.66			8.10	91	21.50				44		
1111	"	9.0					6.67			8.11	91	21.50				44		
1112	"	10.0					6.67			8.10	91	21.46				44		
1113	"	11.0					6.58			7.92	88	20.98				44		
1114	"	12.0					6.44			7.34	79	19.50				44		
1115	"	13.0					6.14			6.12	63	17.10				45		
1116	"	14.0					5.96			5.07	49	14.20				46		
1117	"	15.0					5.86			4.15	38	12.21				47		
1118	"	16.0	0.5	7	7.0	8.7	5.83	3.8	2.8	3.15	28	11.07	31	18	0.13	48		
1119	"	17.0					5.81			2.60	23	10.33				48		
1120	"	18.0					5.80			2.53	22	9.90				48		
	BOTTOM	18.3		HYDROLAB USED FOR -- pH, DO, TEMP., AND COND.														

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QUABBIN LABORATORY RECORDS 1993
DEM HILL---(RESERVOIR)

SAMP NO.	DATE SAMP	DEPTH M	TURB-IDITY	COLOR	CHLO-RIDE	HARD-NESS	pH	ST.M. ALK.	E.P.A. ALK.	DISS OXYGEN PPM	DISS OXYGEN %SAT	TEMP. DEG.C.	RESIDUE TOTAL	RESIDUE FIXED	Fe	SPEC. COND.	COLIFORM COLONIES PER 100 ML. M.F. TOTAL	COLIFORM COLONIES PER 100 ML. M.F. FECAL
1237	10/06	0.0											RES. ELEV. 524.81				1	1
1238	"	1.0	0.4	7	7.2	10.2	6.35	4.1	2.2	8.66	87	15.89	28	16	0.10	46		
1239	"	2.0					6.40			8.66	87	15.89				46		
1240	"	3.0					6.43			8.61	87	15.87				46		
1241	"	4.0					6.43			8.57	86	15.76				45		
1242	"	5.0					6.43			8.59	85	15.70				45		
1243	"	6.0					6.42			8.63	86	15.68				45		
1244	"	7.0					6.41			8.63	86	15.68				45		
1245	"	8.0					6.41			8.58	85	15.65				45		
1246	"	9.0					6.40			8.58	85	15.64				45		
1247	"	10.0					6.40			8.55	85	15.64				45		
1248	"	11.0					6.40			8.55	85	15.63				45		
1249	"	12.0					6.39			8.62	86	15.63				45		
1250	"	13.0					6.40			8.59	85	15.61				45		
1251	"	14.0					6.41			8.53	85	15.60				45		
1252	"	15.0					6.40			8.47	84	15.58				45		
1253	"	16.0					6.40			8.49	84	15.54				45		
1254	"	17.0	0.5	7	7.3	10.8	5.96	4.2	2.5	4.18	40	13.42	29	19	0.12	47		
	BOTTOM	17.8																
1352	11/03	0.0											RES. ELEV. 524.10				0	0
1353	"	1.0	0.4	5	7.3	10.0	6.46	5.1	3.4	9.66	86	10.60	34	21	0.15	47		
1354	"	3.0					6.48			9.67	86	10.59				47		
1355	"	6.0					6.48			9.72	87	10.56				47		
1356	"	9.0					6.48			9.76	87	10.53				46		
1357	"	12.0					6.49			9.78	87	10.50				46		
1358	"	15.0					6.49			9.80	88	10.47				46		
1359	"	16.5	0.4	7	6.4	10.0	6.51	4.3	2.2	9.79	88	10.35	33	21	0.13	46		
	BOTTOM	17.5																
AVG.			0.4	7	6.5	9.8	6.47	4.17	2.68	8.54	85	15.52	31	19	0.07	45	0	0
MAX.			0.5	10	7.3	14.3	6.97	5.1	3.4	10.90	107	25.43	35	23	0.15	48	1	1
MIN.			0.3	5	5.5	8.2	5.80	3.7	2.0	2.53	22	7.26	28	15	0.03	43	0	0

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NO DATA

4.4 SPECIAL INVESTIGATIONS

QUABBIN LABORATORY RECORDS 1993 REVET ANALYSIS

POND VIEW CONDO'S - HUBBARDSTON -- SURFACE WATER

DATE SAMP	ALUM-INUM	CAD-MIUM	COP-PER	NICKEL	LEAD	ZINC	IRON	CAL-CIUM	ARSENIC	MERCURY	SILVER	CHRO-MIUM	MAGNE-SIUM
01/20	3.30	<0.004	<0.01	<0.03	0.121	0.106	720.0	16.4	0.188	<0.0002	<0.01	0.011	1.93

01/20 SAMPLE COLLECTED FOR V.O.C. -- ONE COMPOUND ABOVE DETECTION LIMIT -- TOTAL XYLENES 2 ug/L METHOD 624

HUBBARDSTON -- SEEP-STUMP DUMP

01/20 SAMPLE COLLECTED FOR V.O.C. -- ALL COMPOUNDS WERE BELOW DETECTION METHOD 624

DAVIS FARM -RUTLAND -- STORM DRAIN EFFL

06/20 SAMPLE COLLECTED FOR (MBAS) SURFACTANTS -- RESULTS WERE, 0.45 mg/L

5.0 APPENDIX B
SUPPLEMENTARY REPORTS

METROPOLITAN DISTRICT COMMISSION
DIVISION OF WATERSHED MANAGEMENT
QUABBIN SECTION
GULL CONTROL ACTIVITIES ON QUABBIN RESERVOIR - 1993-94

DRAFT REPORT

Prepared by,

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Metropolitan District Commission
M. Ilyas Bhatti, Commissioner

Division of Watershed Management
Joseph M. McGinn, Director

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II.	Gull Behavior and Numbers	2
III.	Harassment Effort	2
IV.	Program Implementation: Phase 1-4	4
V.	Costs	8
VI.	Discussion	8

GULL CONTROL ACTIVITIES ON QUABBIN RESERVOIR 1993-94 SUMMARY -

The Quabbin Gull Control Program, during the 1993-94 gull season, assured that bacterial levels at the Chicopee Valley Aqueduct (CVA) were in compliance with the DEP/EPA requirements for the Quabbin Reservoir filtration waiver. The Gull Control Program prevented fecal coliform counts at the CVA from exceeding the 20 fecal coliform standard more than the allowed 13 times. The standard was exceeded five times, mainly due to adverse weather conditions when boats could not be launched on the Reservoir.

A substantial amount of staff time and resources were expended to assure that Quabbin Reservoir's water supply complied with DEP/EPA bacterial standards. Approximately 25 staff members contributed 212 hours of overtime along with countless hours of regular time from October through April to protect Quabbin's water supply.

I. BACKGROUND

In recent years, night roosting of gulls (*Larus* sp.) on Quabbin Reservoir during fall and winter months has been linked to elevated bacterial counts in the Chicopee Valley Aqueduct (CVA). After collecting baseline data on this situation for several years, MDC began a program of gull harassment in the fall of 1992 to discourage the birds from roosting in the vicinity of the CVA intake. The goal of this program was to move the roosting gulls away from the intake area, so that the natural settling and 2dilution effects of the reservoir would minimize bacterial levels in the water entering the intake. This report summarizes the methods, results and lessons of this program.

II. GULL BEHAVIOR AND NUMBERS

A large number of Herring (*Larus argentatus*) and Black-backed (*Larus marinus*) gulls have used Quabbin Reservoir as a night roost for a number of years. Although a small number of gulls occur on the reservoir during summer months, the highest concentrations occur during late fall and early winter (until reservoir ice-up). A smaller, temporary influx also occurs in the early spring shortly after "ice-out".

The gulls generally arrive at the reservoir late in the afternoon, roost on the open portions of the reservoir during the night and depart for their daytime feeding areas soon after daybreak. Two main flight paths are used by birds leaving and arriving at the reservoir - one to the west (towards Amherst) and one to the southwest (towards Springfield). Observations at area landfills and sewage treatment plants suggest that such facilities in Amherst, Hadley and in several Springfield-area communities are used as feeding sites during the day.

The number of gulls using the reservoir for roosting varies considerably from day to day, ranging from almost none to over 3000 birds during the fall (1993) and winter (1993-94). It is believed that the Connecticut River serves as an alternate roost site in the area and it's likely that on those occasions when few gulls show up at Quabbin that they have chosen to roost on the river instead.

III. HARASSMENT EFFORT

The initial objective of the gull harassment effort was to create a "gull-free" zone extending outward approximately two miles from the CVA intake. Gulls were harassed only if they attempted to roost within that zone. However, due in part to a significant increase in the number of gulls roosting on the reservoir in fall

of 1993, the northern limit of this gull-free zone was extended to a point approximately 3.5 miles from the intake (Figure 1). Further, in an attempt to reduce the availability of a major food source for the gulls, harassment activities were also conducted at the Amherst Landfill starting in late December.

The harassment program included two main components: (1) human presence, and (2) the use of pyrotechnic devices. State and federal permits were also obtained to employ lethal control methods if the harassment program was ineffective. However, this did not prove to be necessary.

When ice and weather conditions permitted, the boat was used as the main means of harassment at the reservoir. At the landfill, program personnel were stationed in a conspicuous vehicle close to the active face of the landfill operation. The objective of this phase of the program was to prevent the gulls from successfully feeding at the landfill during the day. Shellcrackers, screamers and/or bangers were fired only if and when necessary to re-enforce the effect of the human presence. A second shotgun was purchased for the program to allow for the use of two boat patrols.

Harassment efforts at the reservoir began on November 22, continued through mid January at which time the reservoir was almost completely frozen. The boats were used through early-January, when ice conditions near the boat ramp precluded further use. However, harassment efforts continued from several shoreline vantage points after that time.

The reservoir program was conducted on most weekday evenings from November 22 through December 6. However, when a pattern of higher fecal coliform counts on Mondays was noticed in early December, the program was expanded to seven days a week. Efforts were concentrated on the two-hour time period before darkness. Daily assessments were made - based on water quality results, weather and visibility conditions, plus gull numbers and activity - regarding the need for harassment and appropriate methods. This added an element of variability and unpredictability in the program which prevented the gulls from acclimating to the harassment.

Personnel use ranged from one to five people per day. On most days, only one boat was used, although a second boat was added on three evenings. When the boats were used, two laborers were present in each (one driving the boat; the other using the shotgun) with a supervisor on the shore. On a couple occasions, a third person was added to the boat as a safety precaution (e.g., in particularly inclement weather). When the boats were not used one or two laborers harassed the gulls from several shoreline locations while the supervisor monitored gull locations and behavior from the vicinity of the administration building. Occasionally, only one person stayed to monitor gull locations and fire shellcrackers from the shoreline if necessary.

Gull numbers and locations, weather and wave conditions, types of harassment used, and the responses of gulls to those efforts were recorded daily on data forms (Figure 2). Portable radios were used to maintain contact between the boat/vehicle personnel and the supervisor.

Supervision duties were rotated among Environmental Quality staff members (Bob Bishop, Peter Deslauriers, and Dave Chandler). Laborers were selected daily from a list of those who had indicated an interest in working on the program. Gull counts and bird behavior elements of the program were overseen by Paul Lyons, with assistance from other state and federal personnel.

Operations at the Amherst Landfill started on December 23, after Amherst officials and local residents had been notified of the plans, and ran through mid-January. Gull numbers at the landfill declined dramatically after only two days of harassment. Pre-harassment counts indicated that more than 1,000 gulls were using the landfill at certain times of the day. By the third day of harassment, however, gull numbers had declined to less than 40 birds.

MDC continued to station personnel at the landfill during regular hours of operation through January 14. Gull numbers at the landfill remained low throughout this period, so a starter pistol and a supply of pyrotechnics were provided to landfill operators at that time so they could continue harassment activities, as needed, during the remainder of the winter.

IV. PROGRAM IMPLEMENTATION: PHASES 1-4

The Quabbin Gull Control program was successful in meeting the DEP /EPA filtration waiver standard and prevented the fecal coliform counts at the CVA from exceeding the 20 fecal coliform standard more than the allowed 13 times. The standard was exceeded five times (MWRA data) mainly due to weather conditions when harassment by boat could not be instituted due to safety concerns. A summary of the program follows.

PHASE 1

November 1, 1993 - Increased water sampling

The Quabbin gull program began on November 1, 1993. At that time sampling at the CVA was increased from once a week to four times a week (Monday through Thursday). The purpose of the sampling was to determine when the next phase of the program, which was to deploy a boat on the Reservoir, would be implemented.

PHASE 2

November 22, 1993 - Boat Harassment five days a week

All MWRA counts preceding this date were under nine fecal coliform. However, MDC had a count of 13 fecal coliform on November 11, 1993 and it was decided to deploy the first boat and begin the gull "herding" program. Gulls would be herded above a line drawn from Gate 5 to the tip of Prescott. This method and location proved successful during the 1992 Gull Control Program. Increased staff efforts, above the 1992 program level, would include a boat on the water Monday through Friday and sampling at 5 p.m.

PHASE 3

December 6, 1993 - Boat Harassment seven days a week

MWRA fecal coliform count for this date hit a high of 41. All previous dates were under 9 with the exception of a 19. Since both the 41 and 19 counts occurred on Mondays it was decided to begin Phase Two which would include boat deployment seven days a week, weather permitting.

December 13, 1993

The MWRA fecal coliform count was 33. Unfortunately a storm hit on Saturday the 11th with blizzard like conditions and zero visibility. Sunday the 12th and Monday the 13th saw high winds of 40 MPH and 3 foot waves. No boats were launched on Saturday, Sunday, or Monday due to safety conditions. Fecal coliform counts exceeded the standard on December 13, 14, 16, and 17. The high counts were due to very high numbers of gulls (2000 -3000); a constant north west wind of 40 mph blowing directly at the intake for 4 days; and 3 days of unsafe boating conditions during which the gulls could not be moved.

PHASE 4

December 20, 1993 - Two boats, No gull landing zone

The MWRA count and MDC counts dropped to slightly below the 20 fecal coliform standard. This was due to harassment on Saturday the 18th and Sunday the 19th. It was decided that the counts were not low enough and another storm with northwest winds might push the counts over the limit. Phase four was begun on this date.
The number of boats was increased to two. An aggressive "no gull landing" zone was extended from Windsor Dam to Gate 8 a distance of approximately 3.5 miles. Gulls were allowed to land north of this line and were occasionally pushed a mile north of it if conditions were favorable.

In addition, attempts were made to move the gulls out of the west arm of the Reservoir, up Enfield Channel and towards the Goodnough Dike area. The gulls did not want to fly up Enfield Channel and would double back into the West Arm of the Reservoir. This plan was discontinued.

A meeting was held with the Town of Amherst and Division of Fish and Wildlife to discuss Gull control at the Amherst landfill.

PHASE 5

December 22, 1993 - Amherst Landfill

The MDC counts dropped dramatically to 5 and MWRA to 12 due to the "no gull landing" zone. Residences around the Amherst landfill were given letters of explanation concerning future gull control activities at the land- fill.

December 23, 1993

Gull harassment with shell crackers begins at the Amherst landfill. MDC highest fecal count for the day was seven and MWRA had a count of six.

December 24, 1993

Gull harassment continues at the landfill. An extra thick cover is2applied on the landfill. Gull numbers at the landfill begin to decrease.

December 25, 1993

No activities at landfill. Quabbin Reservoir has gull control from shore but no boat. Very low numbers of gulls.

December 26 and 27, 1993

No boats on the Reservoir due to extreme wind. Approximately 30 to 50 gulls observed each day.

PHASE 3 Level

December 28 and 29, 1993 - Return to Phase 3 level

Return to a Phase 3 level of activity. One boat is to be launched seven days a week, weather permitting. Gulls are herded above the Gate 5 line. Shell crackers are used only if absolutely necessary.

Fecal coliform counts for the week of December 26 have all been four or under for both the MDC and MWRA. Gull numbers on the Reservoir and at the Amherst landfill are both in the 60 and under range.

January 10, 1994

The program was reduced to one shore person at Quabbin. No weekend harassment or sampling since no gulls were seen on the reservoir since January 2, 1994. Landfill harassment will continue. Fecal coliform counts were low.

January 11, 1994

Ice began forming in significant amounts south of Gate 8. Large numbers of ducks use the Blue Meadow Road cove.

January 12, 1994

The Reservoir froze over from the Dam to Gate 8.

PHASE 1 LEVEL

January 13, 1994

Return to Phase 1 level. Bacteria sampling reduced to once per day, Monday through Thursday

January 14, 1994

Landfill harassment is turned over to Town of Amherst.

February 15, 1994

Fecal coliform counts have all been zero since January 8, 1994. Sampling continues four days per week.

April 14, 1994

Ice melts in the Winsor Dam Area. Significant open water occurs. No gulls. Low bacteria counts.

May 2, 1994

CVA sampling reduced to one day per week. All bacteria samples were low since January.

V. COSTS

Program costs included staff overtime, gasoline for boat and vehicle, and equipment costs. A new 19-foot boat and motor were also purchased, largely for use in the gull control program. The costs of the program were broken down as follows:

A.	Overtime (11/22/93 - 1/14/94) -	$ 4,306.25
B.	Gasoline (approximate) -	80.00
C.	Equipment (shells, survival-suits, boat equipment, shotgun) -	2,000.00
D.	New boat/motor/trailer -	25,338.00
	TOTAL:	$31,724.25

VI. DISCUSSION

The gull control program conducted at Quabbin Reservoir during the winter of 1993-94 was successful despite occasional bacterial standard violations and the problems caused by inclement weather and higher than expected gull numbers. Five violations of the DEP fecal coliform standard were recorded during the harassment period, substantially less than the 13 allowable under state regulations. This compares to one violation in 1992-93 and eight violations in 1991-92.

Several factors contributed to the success of this program. First, a consistent harassment effort (extended to seven days per week early in the program) prevented the gulls from ever establishing a roosting area in the "gull-free" zone. This was true, even though the zone was extended northward from the limit used during 1992-93, to compensate for the increased number of gulls using the reservoir this past winter.

Having a second boat available also contributed to program success. The second boat allowed for much quicker response when gulls attempted to land in areas we did not want them to roost. The purchase of boating survival suits also made the boat harassment more efficient, since boat personnel could travel faster, and stay out longer without getting chilled.

By far, however, the ultimate effectiveness of the program resulted from the initiation of harassment at the Amherst Landfill. The dramatic reductions in gull numbers soon after the start of this effort not only alleviated water quality concerns at the reservoir, but also allowed for a substantial reduction in the harassment effort required there.

Finally, we feel that the judicious and conservative use of individual harassment techniques may have prolonged their effectiveness and precluded acclimation by the birds. At both the reservoir and the landfill, different pyrotechnic devices were used at different times, and on some occasions, just the presence of the MDC person was enough to move the birds out of the area. This "mixing" of techniques is important; other studies have clearly demonstrated the adaptability of gulls to harassment techniques that are applied with regularity.

SUMMER 1993 WATER QUALITY REPORT:

CADWELL CREEK TRIBUTARY SYSTEM

METROPOLITAN DISTRICT COMMISSION

DIVISION OF WATERSHED MANAGEMENT

QUABBIN RESERVOIR

Heather E. Wages

INTRODUCTION.

The Cadwell Creek tributary system feeds into the south-west end of the Quabbin Reservoir at Gate Eight in Pelham and is contained wholly within the limits of MDC-owned property. Thus, the Cadwell system, in theory uncontaminated by outside sources, is ideal for the study of summer tributary water quality. Such research could be useful as a baseline for comparison in further studies of tributaries that are not entirely within the confines of the reservation and could possibly be subject to pollution from outside sources.

This report contains water quality data collected on the dates indicated by Heather Wages as summer intern for the Environmental Quality Laboratory at Quabbin Reservoir. Data shown for July 19, with the exception of precipitation, has been generated through interpolation in the interest of maintaining continuity of presentation.

OBJECTIVES.

The objectives of the sampling completed between June 9 and August 12 on the Cadwell Creek tributary system were as follows:

1. To assess the bacteriological quality of the system, testing for total and fecal coliforms.

2. To assess otherwise the ecological health of the system and individual tributaries in an effort to determine relationships between health and outside influences such as weather and human or animal activities.

PROGRAM DESCRIPTION.

The water quality sampling program included weekly analysis of temperature, dissolved oxygen, total and fecal coliforms at the ten sites indicated on the included map. All laboratory work was completed at the Windsor Dam Environmental Laboratory at Quabbin Reservoir. Dissolved oxygen and water temperature were measured on site using a standardized D.O. meter calibrated with saturated air, and total and fecal coliforms were studied according techniques included in Standard Methods for the Examination of Water and Wastewater.

DISCUSSION OF WATER QUALITY ANALYSIS.

Water quality samples were collected weekly from the ten sites included in the Cadwell Creek project from June 9 through August 12. Due to the unusual lack of precipitation in the Quabbin Watershed area during the summer months, several streams became stagnant or dried up entirely as the project progressed. The timing of this and the noted effect on water quality are recorded in the individual discussion on each tributary. Generally, as water flow became slower, dissolved oxygen levels dropped and the presence of total and fecal coliforms increased, with additional fluctuations due to run-off after storms. Chart 1 shows the general relationship between precipitation and average total and fecal coliform counts for each week. As expected, a correlation is observed between low precipitation and high coliform counts. The sudden reduction in both fecal and total coliform counts that is observed over the two weeks of August could be attributed to the increase in precipitation during that time. Also, it was seen that the

downstream sites showed higher dissolved oxygen and much lower coliform counts, indicating that the Cadwell Creek system is adequately self-cleaning.

Out of the ten sites studied, a few emerged as potential problem sites, consistently showing much higher fecal and total coliform counts, even when water flow was high and the average counts for other streams were low. Investigation showed that either animal or human activity was likely responsible in all cases, due to either logging efforts or beaver dams located upstream. These are all noted in the following discussion.

SITE 1. Samples were taken about thirty feet upstream of the mouth of Cadwell Creek at the monitoring station. One of the few sites that did not experience substantial reduction in flow during dry spells, it showed high dissolved oxygen levels between 81% and 104% saturation throughout the summer. Bacteria levels were typically lower at this point than further upstream as well, although a large increase was observed at the end of July, which could be attributed to the long dry spell previous to that time. Digging was also observed in the stream bed on August 12, but it did not noticeably affect either dissolved oxygen levels or coliform counts.

SITE 2. Samples were collected at the mouth of the tributary that joins Cadwell Creek about ten feet upstream of site 1. Sampling was only possible for three weeks, as the stream dried up before the end of June. Dissolved oxygen levels were between 65% and 89% saturation, and coliform counts were within expected limits given the level of the stream.

SITE 3. Samples were also collected on Cadwell Creek just upstream of where site 2 joined the main tributary. Dissolved oxygen levels were between 84% and 95% saturation, and coliform levels were comparable to those of site 1.

SITE 4. Samples were taken where Cadwell Creek passes in a southern direction under the main road to Gate 8. Dissolved oxygen levels started out very high at 119%, but steadily dropped as the level of the stream fell until it was no longer measurable after July 12. Coliforms were close to the average calculated for the summer.

SITE 5. Samples were collected where the tributary east of Dodge Hill crosses under Dodge Rd. Both total and fecal coliforms were consistently very high at this site, peaking at 5500 total and 2700 fecal; this is likely due to a beaver dam known to be located upstream. The marsh upstream of the sampling site made it impossible to walk the entire length of the brook, but the high counts suggest that the dam is active. This tributary was also affected by the dry weather, making it impossible to collect measurements on August 12. Dissolved oxygen levels varied between 110% and 67% saturation.

SITE 6. Sampling was also completed in Cadwell Creek on the tributary west of Dodge Hill. Dissolved oxygen levels were between 103% and 69% saturation, previous to the stream drying up after August 12. Total coliform counts appeared to be closely related to relative rainfall, climbing sharply when little precipitation occurred.

SITE 7. Samples were collected further downstream from Site 6, where the tributary crosses under Juckett Hill Rd north of the power lines. One of the few sites to remain flowing throughout the summer, site 7 also showed abnormally high coliform counts, especially in the later months. The presence of logging efforts upstream, as well as a partially completed beaver dam and beaver sightings in the area suggest many possibilities for reasons for high counts. Dissolved oxygen levels varied between 63% and 95% saturation for the summer.

SITE 8. Samples were taken just south of Gate 8 Rd., where the power lines cross the road. This tributary appeared to come from the south, and is not plotted on the Quabbin map. Always very low, it was still possible to collect samples until August 5, and coliform counts were close to the weekly average. Dissolved oxygen levels were between 65% and 100% saturation.

SITE 9. Samples were also collected just north of the main road, where the tributary crosses back underneath heading north. Here dissolved oxygen levels varied between 64% and 103% saturation, and coliform counts appeared to depend closely on the precipitation, showing the usual trends due to the dry weather.

SITE 10. Samples were collected just west of Juckett Hill Rd by Gate 8 Rd., on the tributary that runs north along that path. This stream dried up at the end of June, but showed an abrupt die-off of fecal coliforms in the last two weeks of the month. Dissolved oxygen levels dropped off rapidly from 105% to 68% saturation in the first few weeks, as well.

CONCLUSIONS.

As expected, the data shows a strong correlation between precipitation and coliform levels. Generally, due to the dry summer, the decreased water flow allowed for more streams to become stagnant and thus support an increased bacteria growth. When precipitation increased, the bacteria counts dropped again quickly. The absence of a standard increase in coliform count after a storm could be due to quick absorbance of all precipitation, preventing the usual run-off which tends to contribute to bacterial presence in the water.

The two tributaries that showed the highest coliform counts, site 5 and site 7, have been accounted for due to the presence of upstream disturbances such as logging or beaver activities, and thus there is no evidence of any outside pollution sources affecting the Cadwell Creek system.

Heather Wages would like to thank Bob Bishop for overseeing her internship at Quabbin Reservoir this summer, and also Peter Deslauriers and David Chandler for help and encouragement in the lab.

CADWELL MEMORIAL FOREST
Mt Lincoln
Lookout Tower
TOWN
GATE
8
9
10
DODGE HILL
GATE 8 BAIT SHOP
(PACKARDSVILLE)
PELHAM
EAST HILL
BOAT MOORING AREA NO 1 (GATE 8)
Jackett Hill
SOUTH HILL
FISHING AREA
LIMIT OF FISHING
No Boats South of Line. No Shore Fishing Below Gate 8 Boat Area.
Franklin Pond
Franklin Hill
Hampshire
Entrance
Lookout
Gulf Bk
Cadwell Creek
Chalifoe Bk
Jabish Bk
Goki St
Route 202
West Branch Swift
Co Rd
121
125
129
120
75
40
972
953
733
544
736
1065
1075
1050
1000
950
900
850
800
750
600
550

6/9	D. O. PPM	TEMP. DEG. C.	% SAT. D. O.	COLIFORM TOTAL / 100 ml	COLIFORM FECAL / 100 ml
SITE 1	10.2	13	97.1	16	9
SITE 2	9.3	13	88.6	TNTC	43
SITE 3	9.7	13	92.4	13	6
SITE 4	12.3	14	119	28	27
SITE 5	11.1	15	110	72	102
SITE 6	10.0	17	103	30	3
SITE 7	9.4	16	94.9	21	9
SITE 8	9.8	13	93.3	6	1
SITE 9	10.8	13	103	6	4
SITE 10	11.0	13	105	3	3

6/16	D. O. PPM	TEMP. DEG. C.	% SAT. D. O.	COLIFORM TOTAL / 100 ml	COLIFORM FECAL / 100 ml
SITE 1	10.5	15	104	110	82
SITE 2	8.7	15	86.1	100	40
SITE 3	9.6	14	93.2	126	66
SITE 4	10.2	16	103	36	27
SITE 5	8.4	17	86.6	120	80
SITE 6	8.0	17	82.5	73	46
SITE 7	7.2	18	75.8	128	46
SITE 8	8.9	15	88.1	65	89
SITE 9	8.6	15	85.1	60	60
SITE 10	8.4	15	83.2	30	20

6/23	D. O. PPM	TEMP. DEG. C.	% SAT. D. O.	COLIFORM TOTAL / 100 ml	COLIFORM FECAL / 100 ml
SITE 1	9.4	14	91.3	30	70
SITE 2	6.7	14	65.0	140	100
SITE 3	8.9	14	86.4	120	30
SITE 4	9.3	15	92.1	50	20
SITE 5	7.8	16	78.8	120	60
SITE 6	7.4	16	74.7	70	40
SITE 7	7.6	17	78.4	130	60
SITE 8	8.4	17	86.6	160	70
SITE 9	8.0	15	79.2	70	30
SITE 10	6.9	15	68.3	40	30

6/30	D. O. PPM	TEMP. DEG. C.	% SAT. D. O.	COLIFORM TOTAL / 100 ml	COLIFORM FECAL / 100 ml
SITE 1	8.0	16	80.8	50	10
SITE 2					
SITE 3	8.5	15	84.2	0	0
SITE 4	8.7	17	89.7	30	20
SITE 5	6.9	17	71.1	130	30
SITE 6	7.4	17	76.3	100	30
SITE 7	6.5	19	69.9	300	120
SITE 8	6.4	18	67.4	60	60
SITE 9	8.4	16	84.8	60	20
SITE 10	7.0	16	70.7	40	0

7/7	D. O. PPM	TEMP. DEG. C.	% SAT. D. O.	COLIFORM TOTAL / 100 ml	COLIFORM FECAL / 100 ml
SITE 1	8.8	19	94.6	20	20
SITE 2					
SITE 3	8.1	18	85.3	40	0
SITE 4	7.7	22	86.5	50	0
SITE 5	5.8	21	64.4	130	10
SITE 6	6.5	20	71.4	230	30
SITE 7	5.8	22	65.2	90	30
SITE 8	7.9	19	84.9	290	40
SITE 9	6.9	18	72.6	150	0
SITE 10					

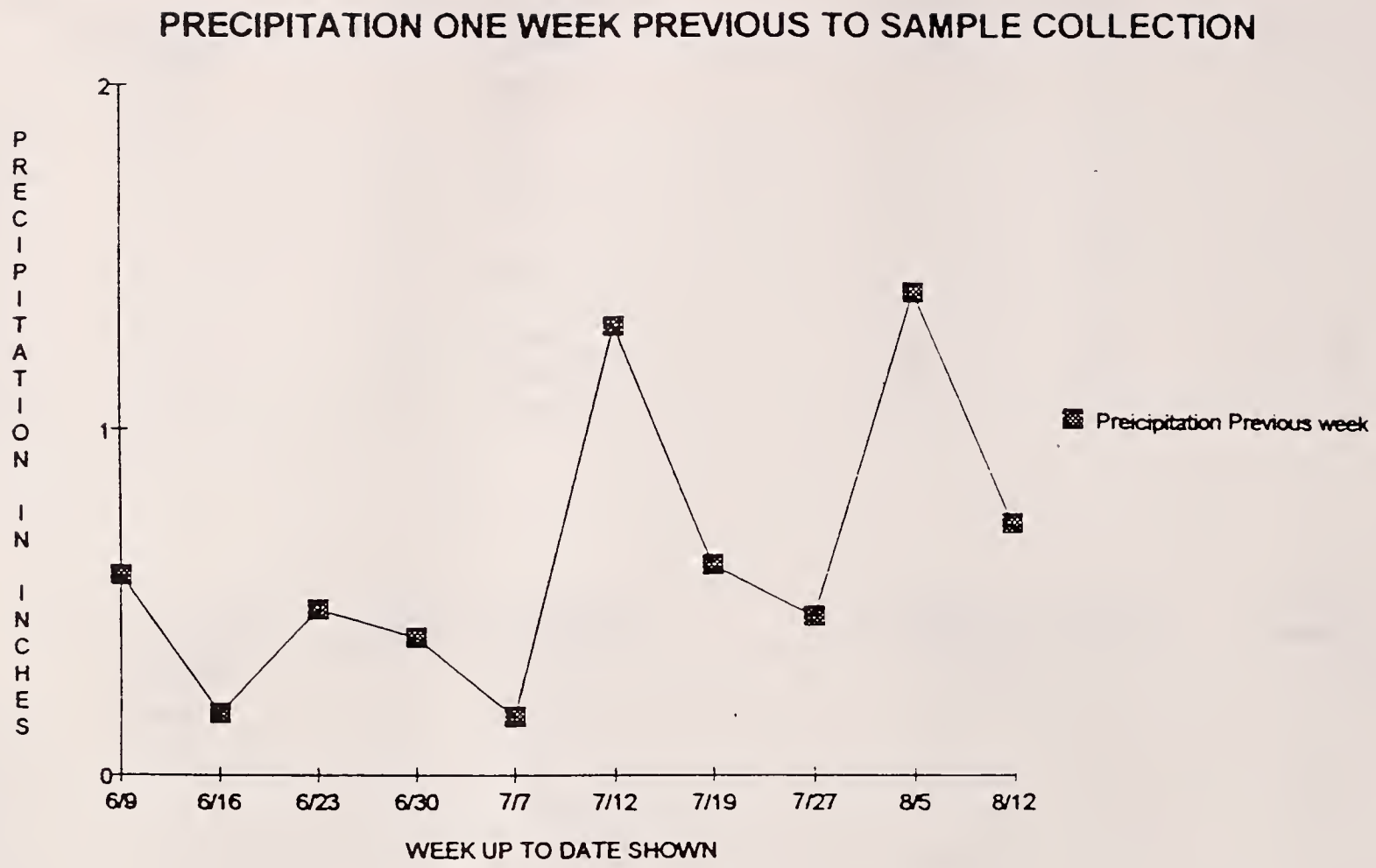
7/12	D. O. PPM	TEMP. DEG. C.	% SAT. D. O.	COLIFORM TOTAL / 100 ml	COLIFORM FECAL / 100 ml
SITE 1	9.3	17	95.9	70	20
SITE 2					
SITE 3	8.8	16	88.9	80	20
SITE 4	7.2	18	75.8	180	60
SITE 5	6.7	17	69.1	1200	50
SITE 6	6.5	18	68.4	180	80
SITE 7	7.8	19	83.9	240	40
SITE 8	7.8	16	78.8	450	160
SITE 9	6.9	17	71.1	390	80
SITE 10					

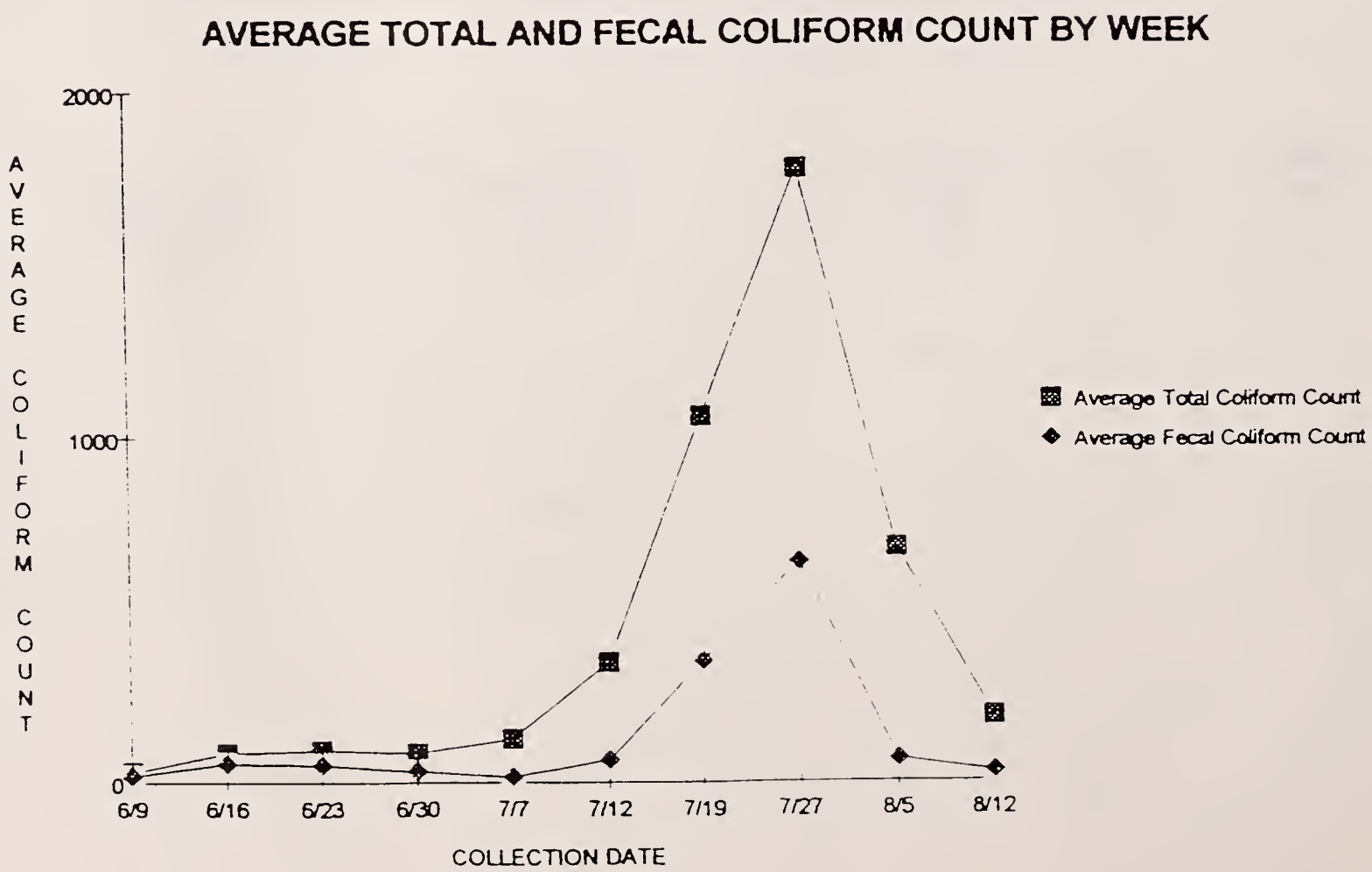
7/27	D. O. PPM	TEMP. DEG. C.	% SAT. D. O.	COLIFORM TOTAL / 100 ml	COLIFORM FECAL / 100 ml
SITE 1	9.8	15	97.0	600	280
SITE 2					
SITE 3	9.6	15	95.0	400	190
SITE 4					
SITE 5	6.8	15	67.3	5500	2770
SITE 6					
SITE 7	7.6	16	76.8	1800	200
SITE 8	10.1	15	100	300	140
SITE 9	7.1	15	70.3	2100	250
SITE 10					

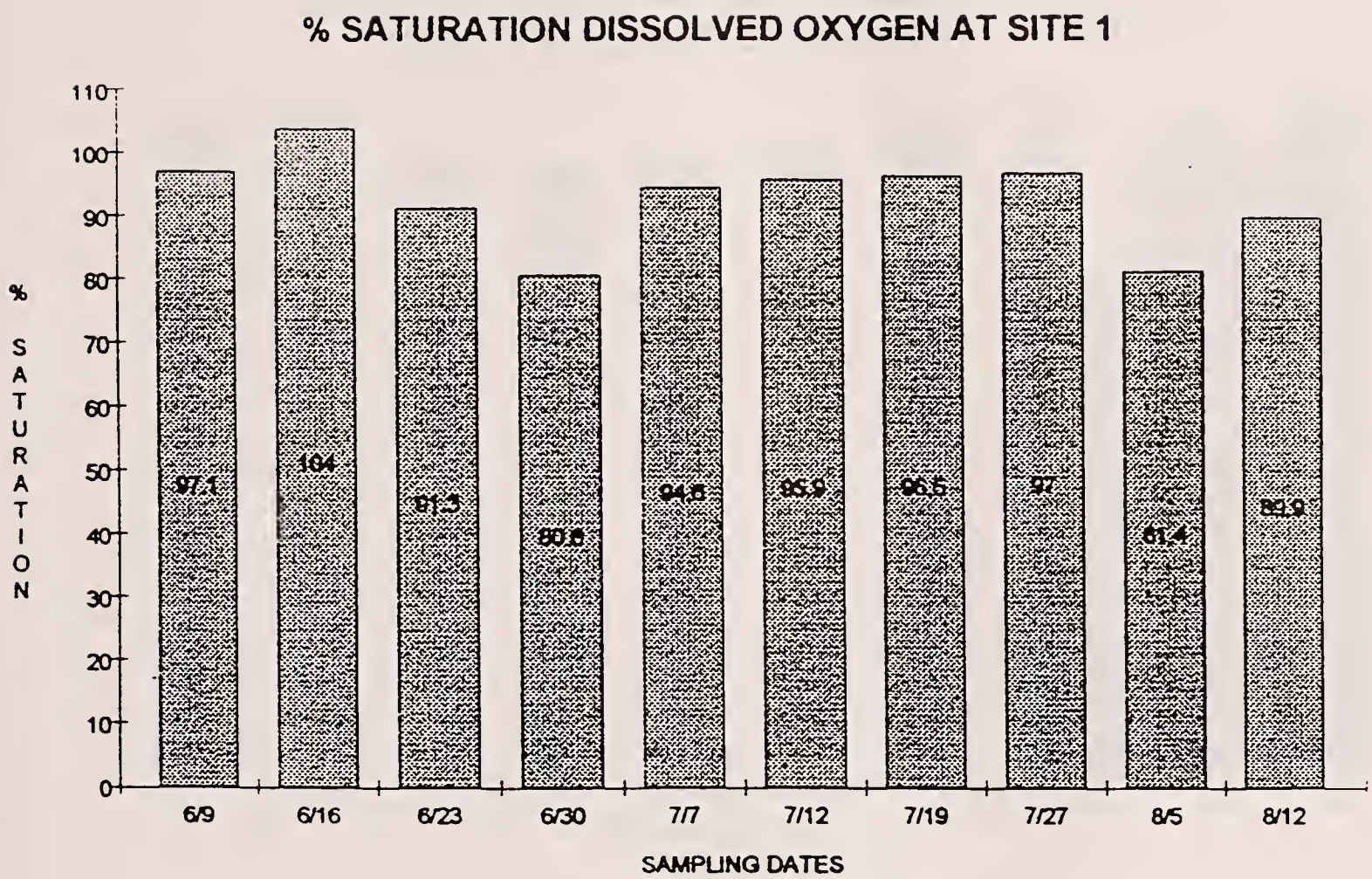
8/5	D. O. PPM	TEMP. DEG. C.	% SAT. D. O.	COLIFORM TOTAL / 100 ml	COLIFORM FECAL / 100 ml
SITE 1	7.9	17	81.4	500	50
SITE 2					
SITE 3	6.4	16	88.9	300	30
SITE 4					
SITE 5	6.5	17	67.0	300	0
SITE 6					
SITE 7	7.0	18	73.7	2000	0
SITE 8					
SITE 9	6.4	18	67.4	300	240
SITE 10					

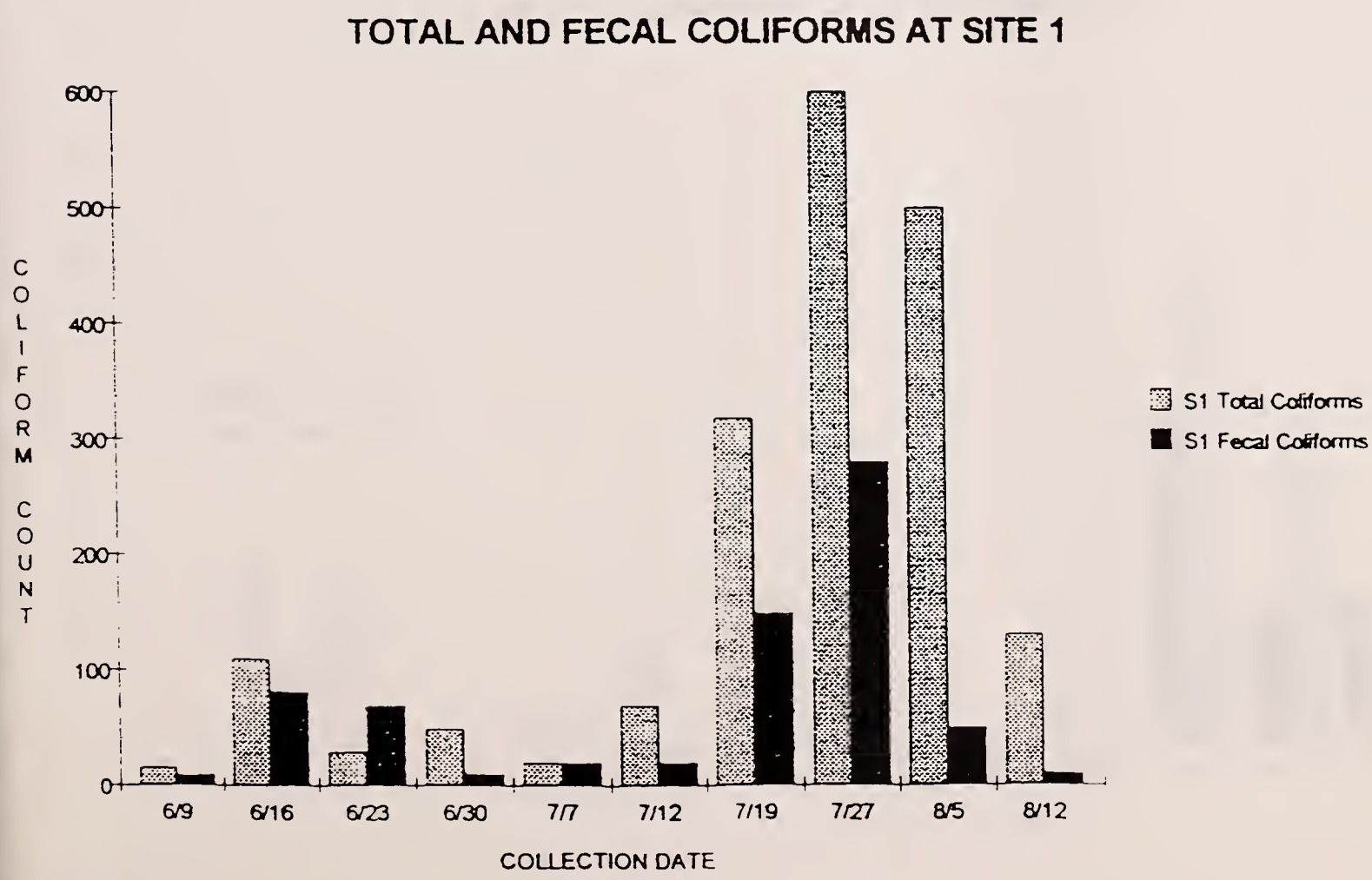
8/12	D. O. PPM	TEMP. DEG. C.	% SAT. D. O.	COLIFORM TOTAL / 100 ml	COLIFORM FECAL / 100 ml
SITE 1	8.9	16	89.9	130	10
SITE 2					
SITE 3	8.6	16	86.9	60	11
SITE 4					
SITE 5					
SITE 6					
SITE 7	6.0	18	63.2	160	34
SITE 8					
SITE 9	6.3	16	63.6	400	60
SITE 10					

CHART 1

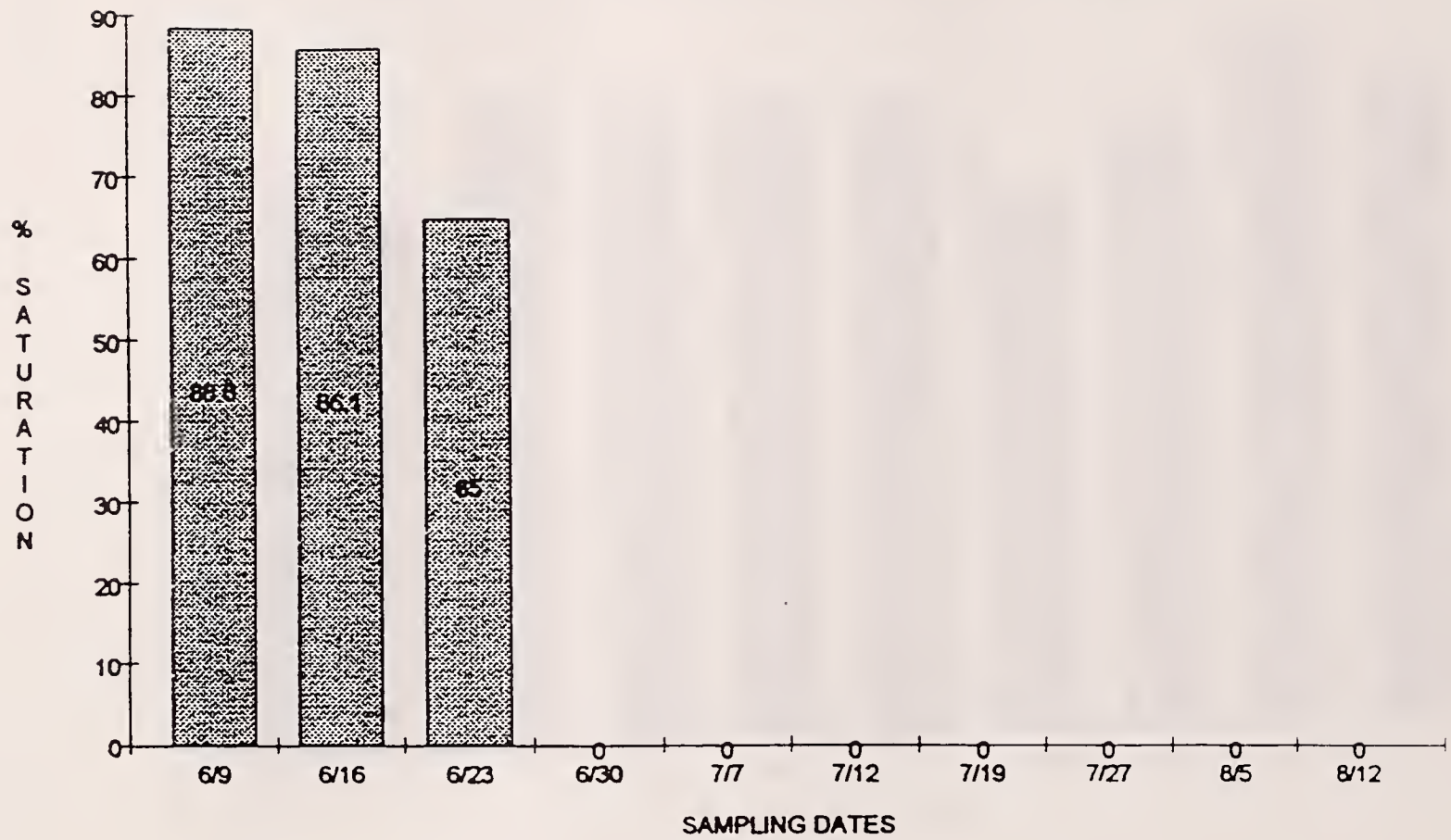

PRECIPITATION ONE WEEK PREVIOUS TO SAMPLE COLLECTION
PRECIPITATION IN INCHES
2
1
0
6/9
6/16
6/23
6/30
7/7
7/12
7/19
7/27
8/5
8/12
WEEK UP TO DATE SHOWN
Preicipitation Previous week


AVERAGE TOTAL AND FECAL COLIFORM COUNT BY WEEK
AVERAGE COLIFORM COUNT
2000
1000
0
6/9
6/16
6/23
6/30
7/7
7/12
7/19
7/27
8/5
8/12
COLLECTION DATE
Average Total Coliform Count
Average Fecal Coliform Count

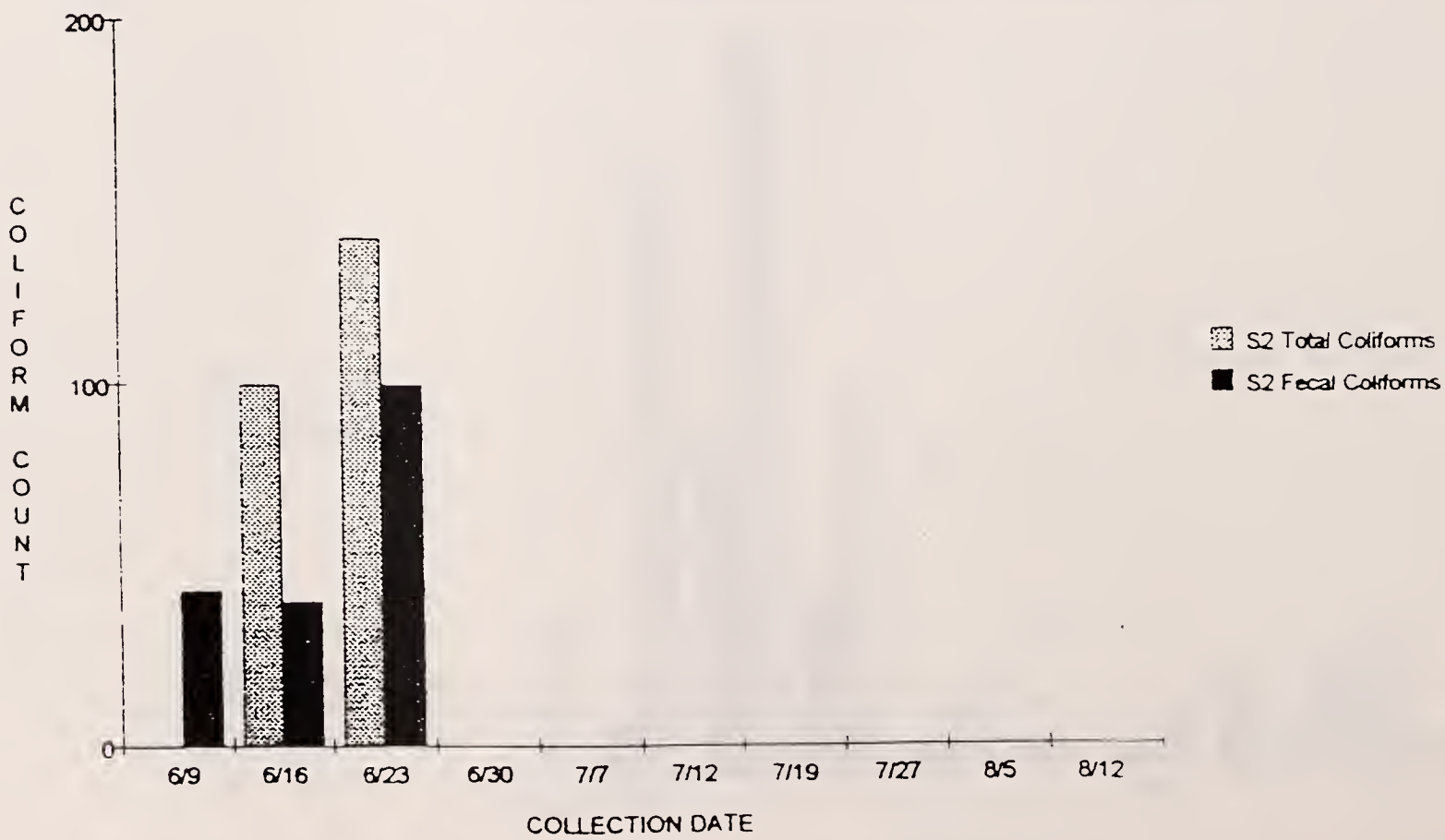

% SATURATION DISSOLVED OXYGEN AT SITE 1
% SATURATION
110
100
90
80
70
60
50
40
30
20
10
0
97.1
104
91.3
80.6
94.8
95.9
96.5
97
81.4
89.9
6/9
6/16
6/23
6/30
7/7
7/12
7/19
7/27
8/5
8/12
SAMPLING DATES

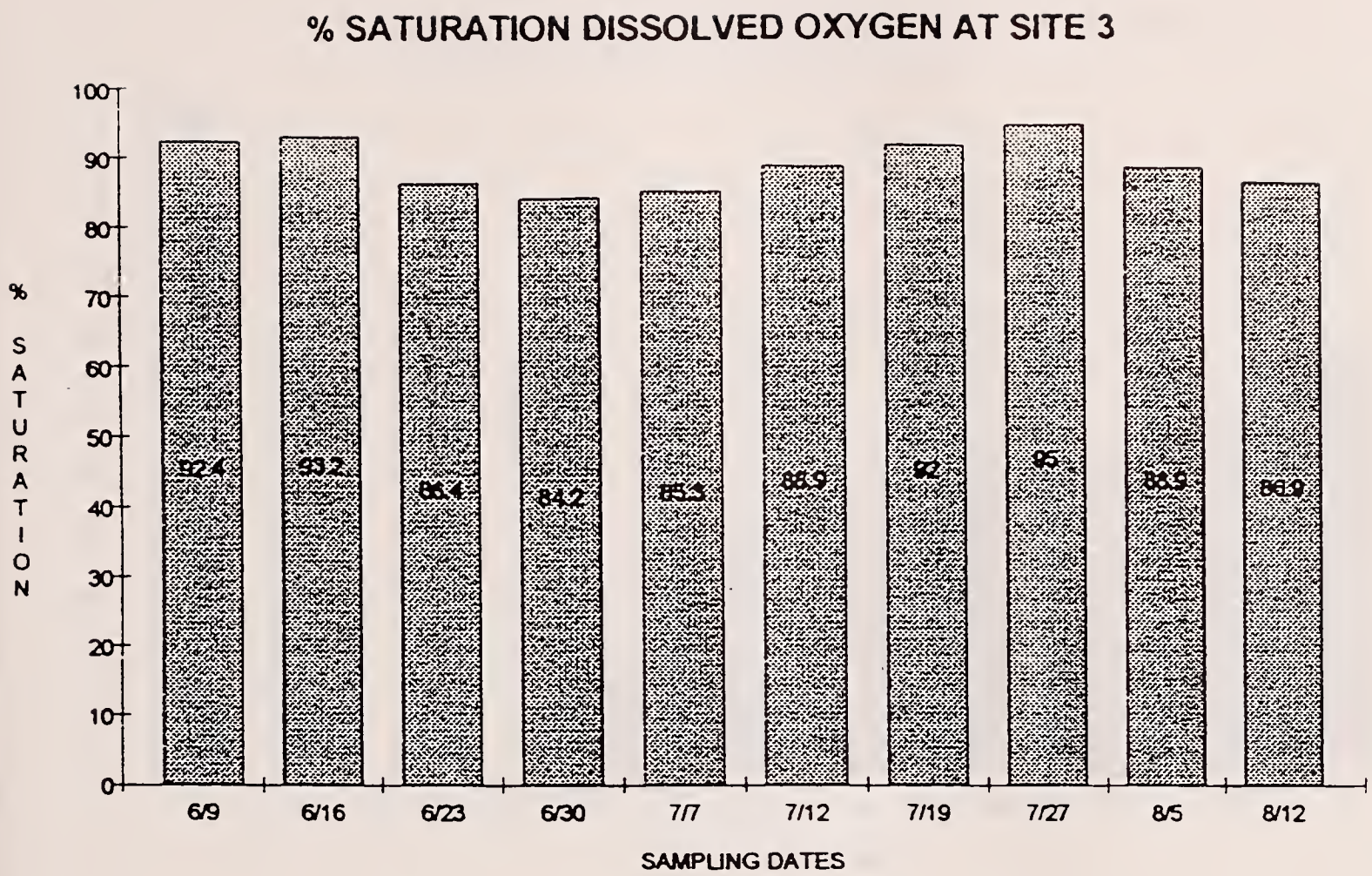

TOTAL AND FECAL COLIFORMS AT SITE 1
COLIFORM COUNT
600
500
400
300
200
100
0
6/9
6/16
6/23
6/30
7/7
7/12
7/19
7/27
8/5
8/12
COLLECTION DATE
S1 Total Coliforms
S1 Fecal Coliforms

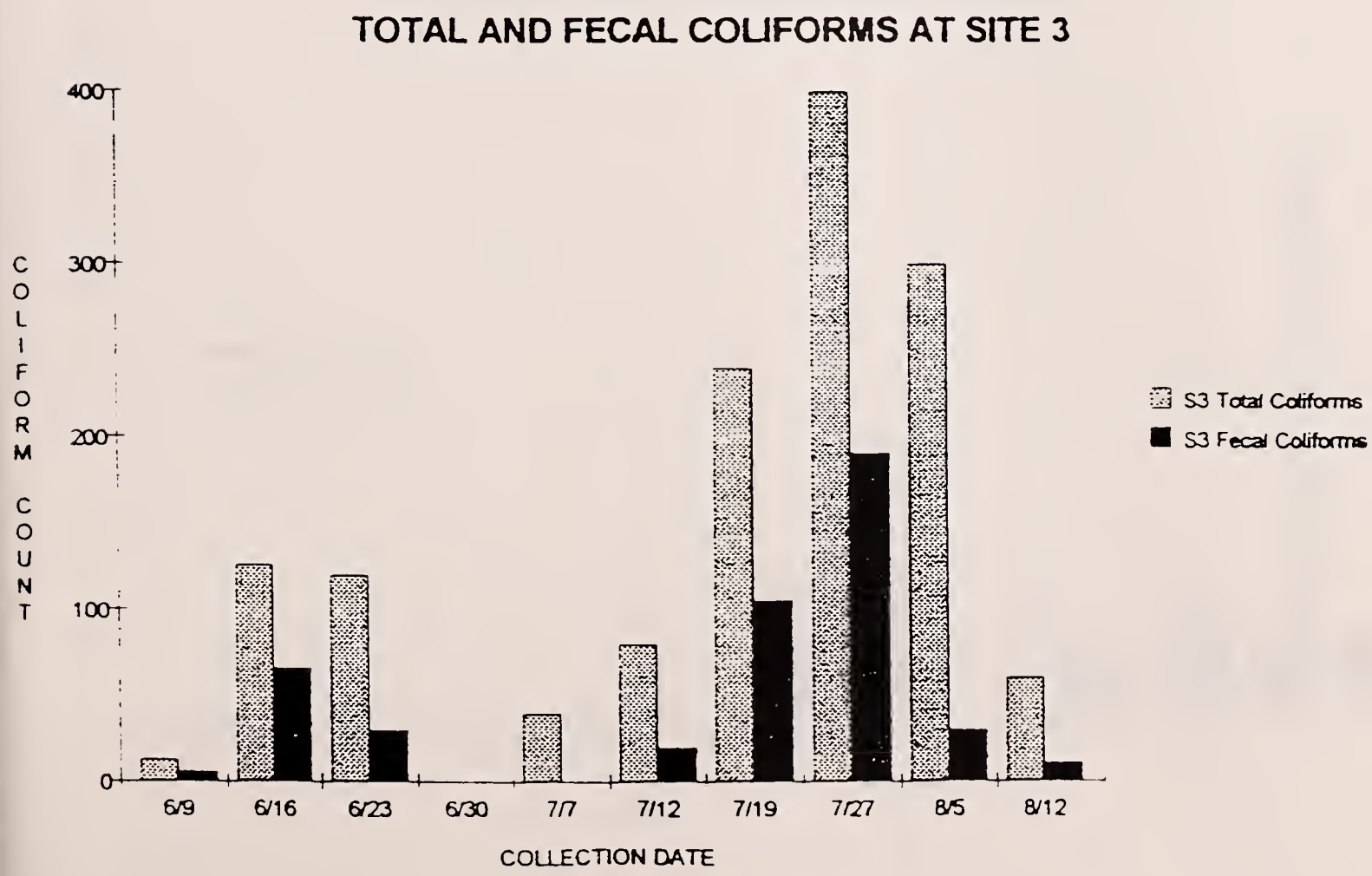
% SATURATION DISSOLVED OXYGEN AT SITE 2

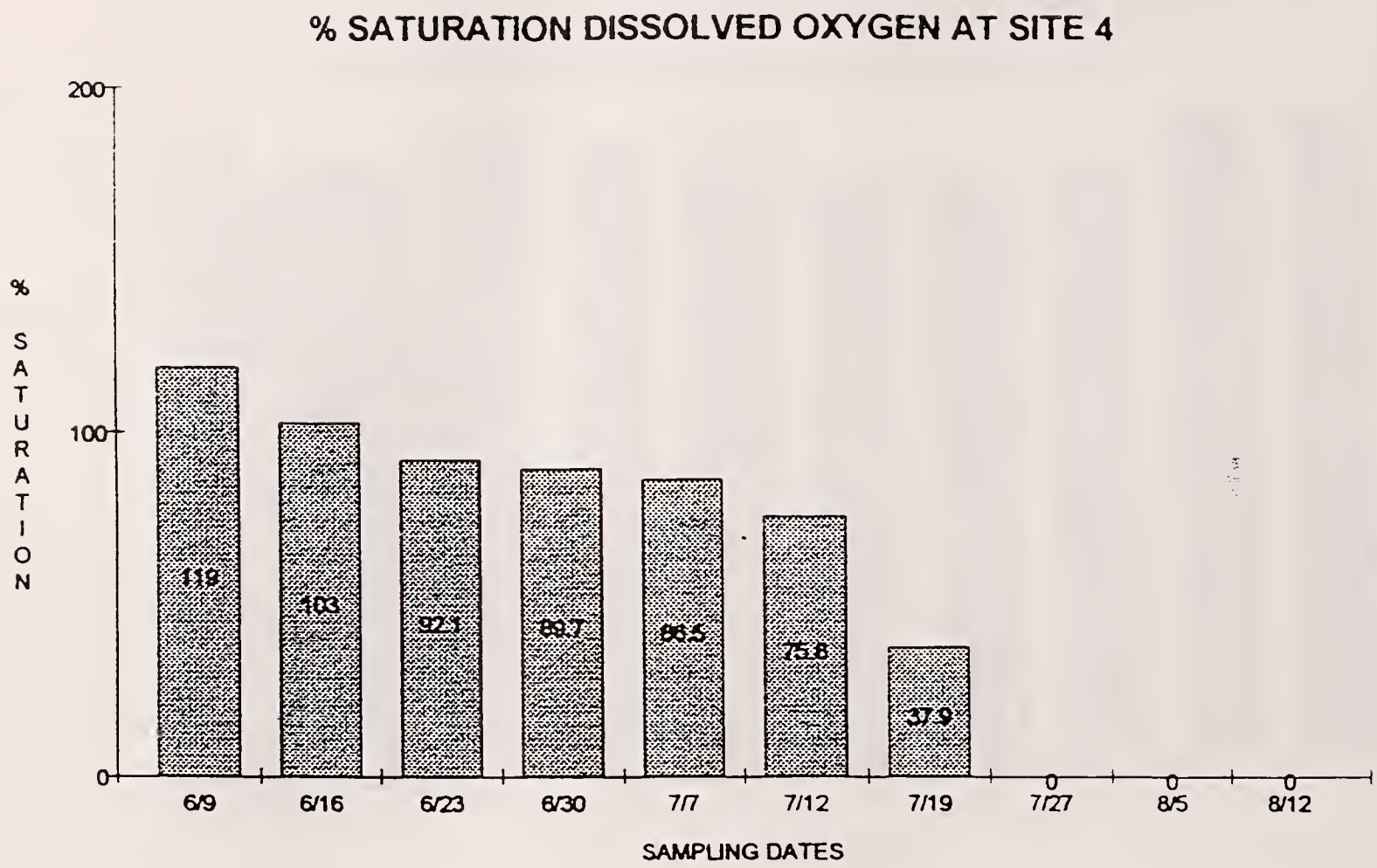


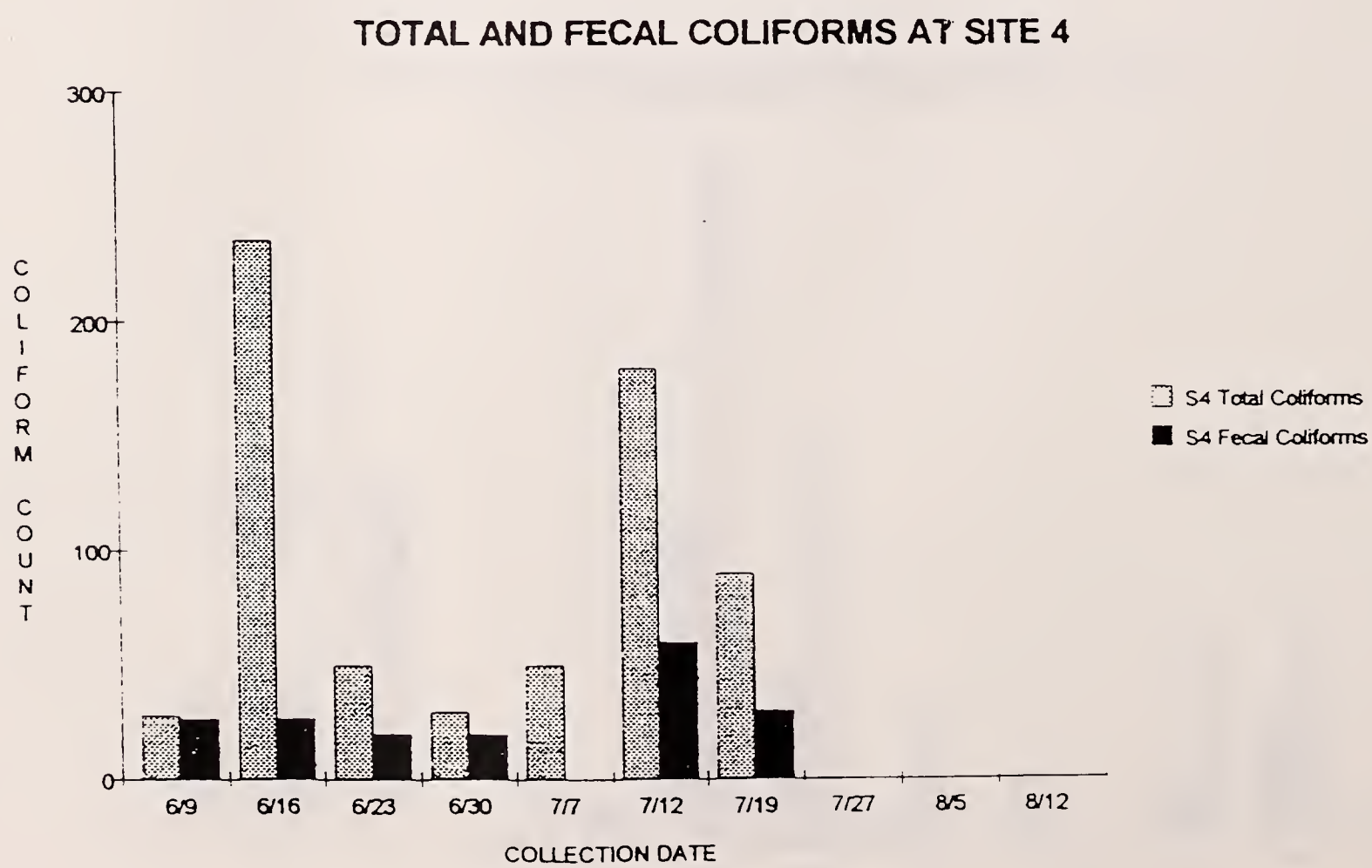
TOTAL AND FECAL COLIFORMS AT SITE 2

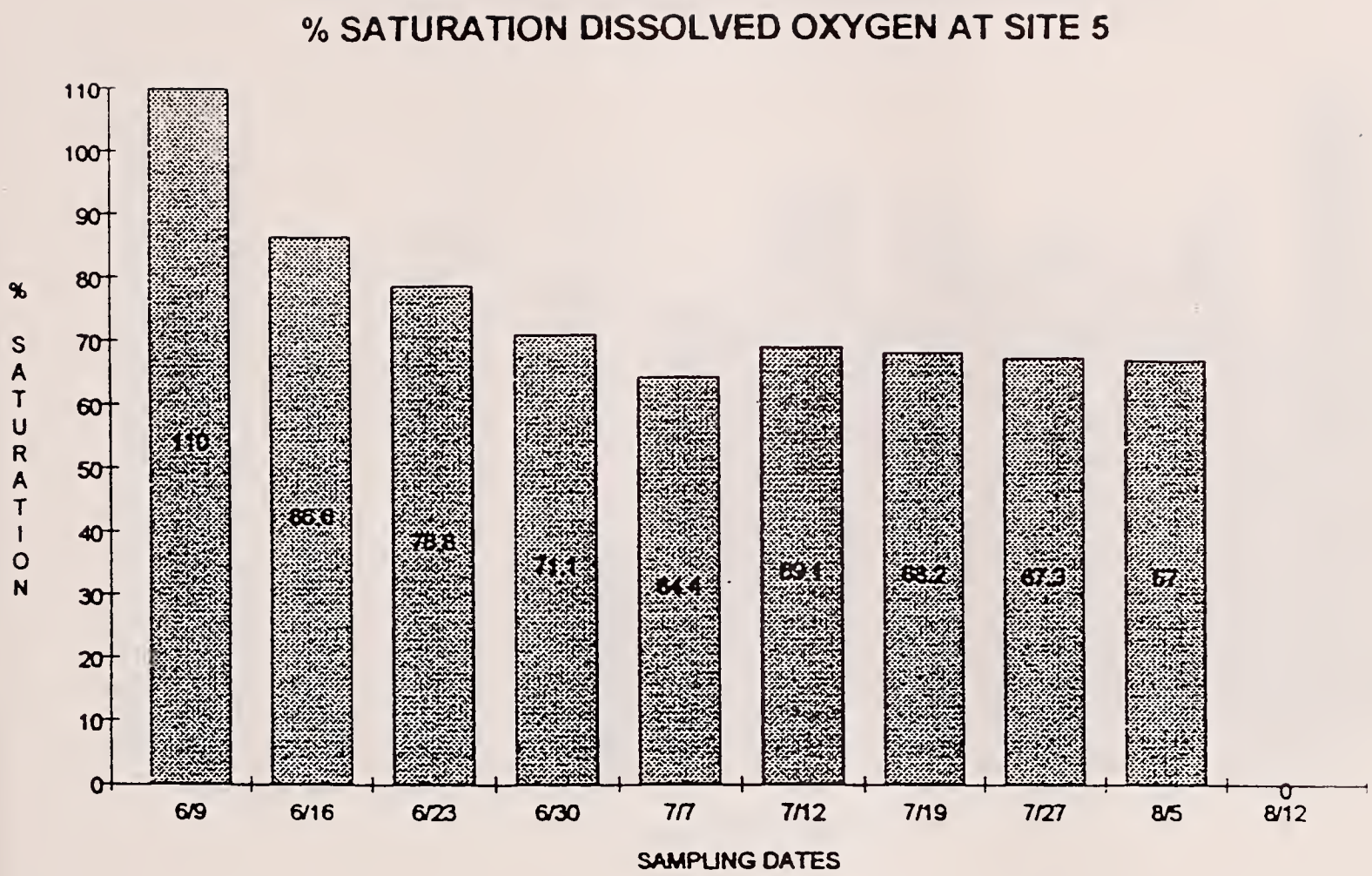


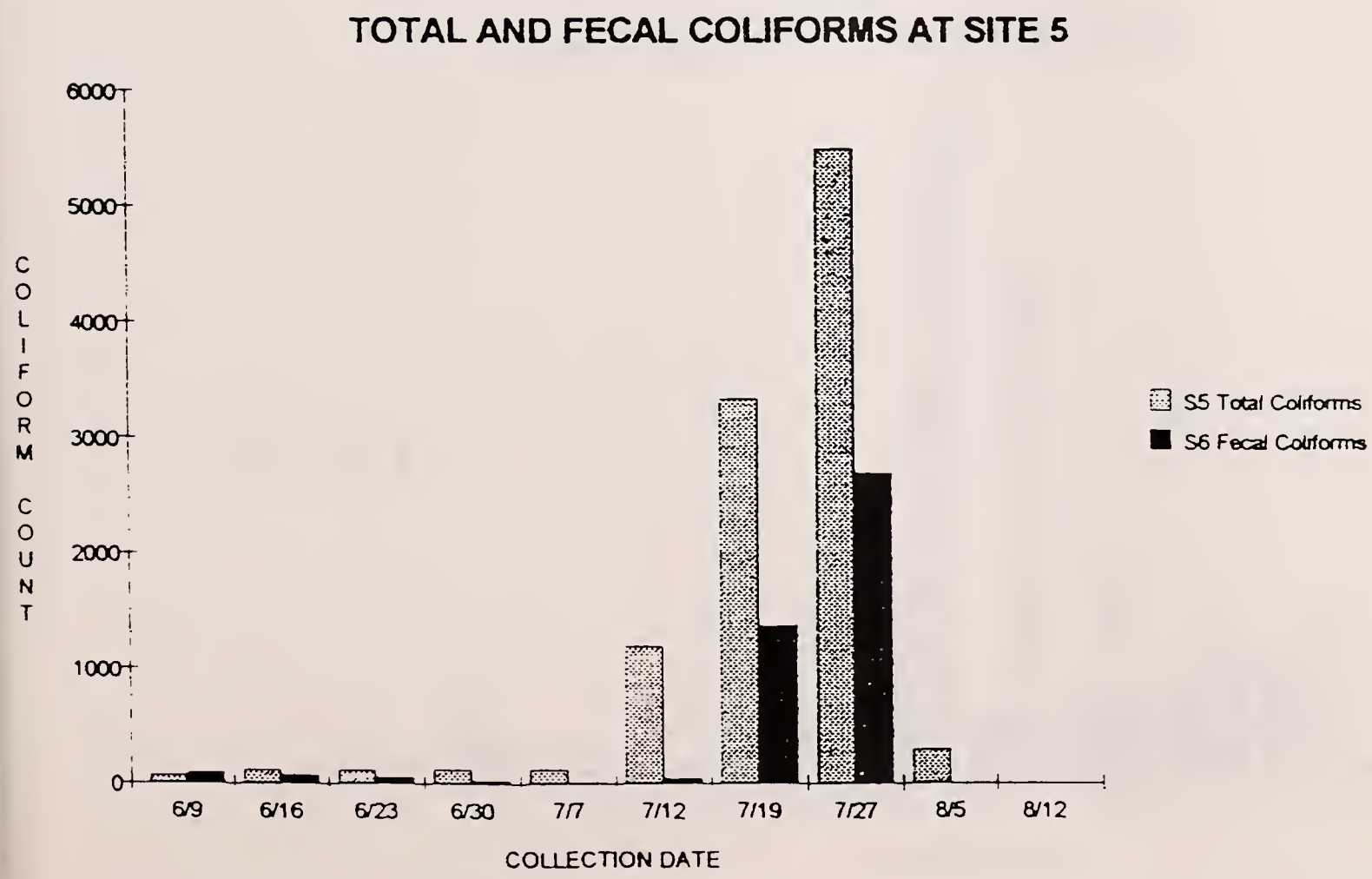

% SATURATION DISSOLVED OXYGEN AT SITE 3
% SATURATION
100
90
80
70
60
50
40
30
20
10
0
92.4
93.2
86.4
84.2
85.3
88.9
92
95
88.9
86.9
6/9
6/16
6/23
6/30
7/7
7/12
7/19
7/27
8/5
8/12
SAMPLING DATES

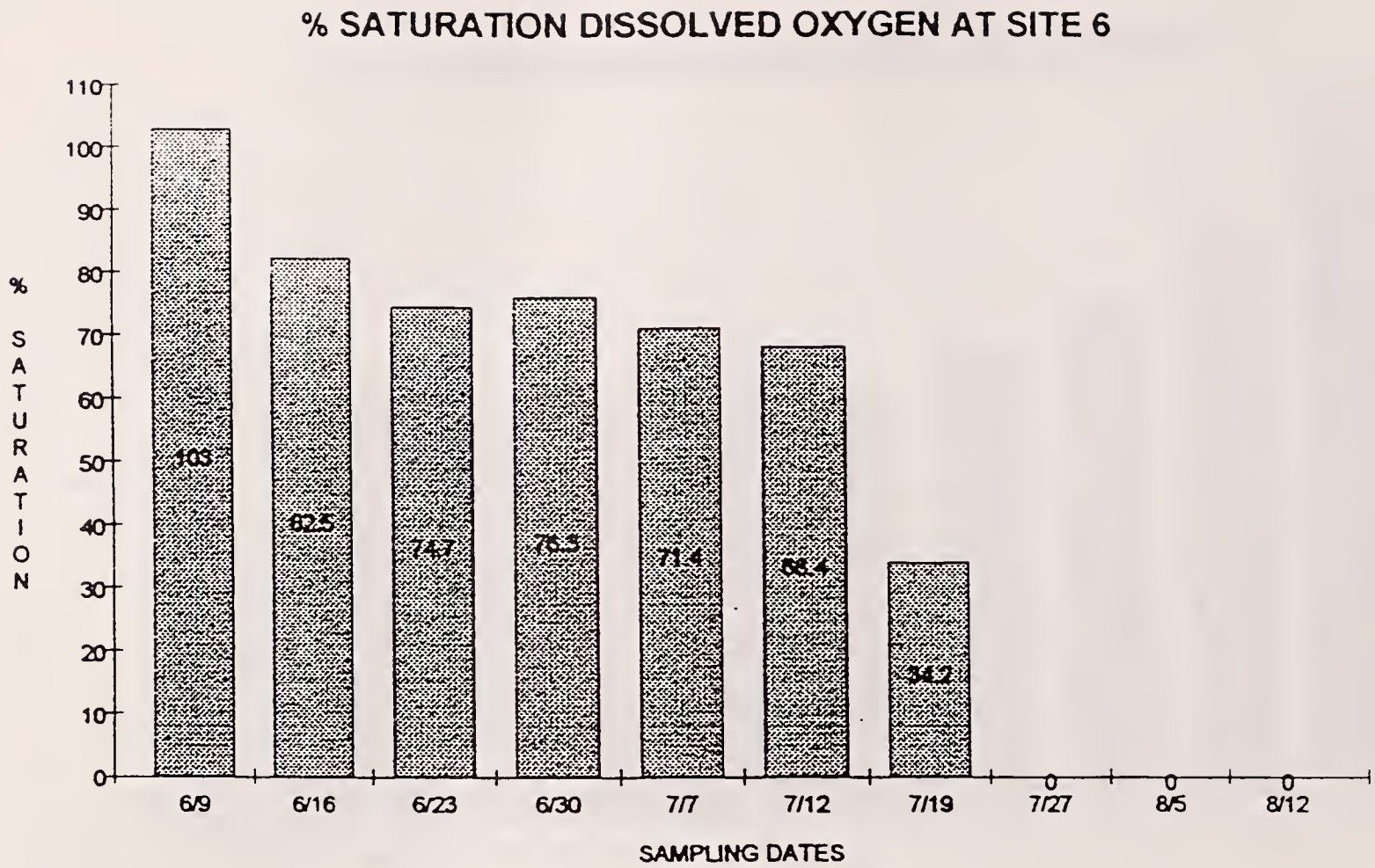

TOTAL AND FECAL COLIFORMS AT SITE 3
COLIFORM COUNT
400
300
200
100
0
6/9
6/16
6/23
6/30
7/7
7/12
7/19
7/27
8/5
8/12
COLLECTION DATE
S3 Total Coliforms
S3 Fecal Coliforms

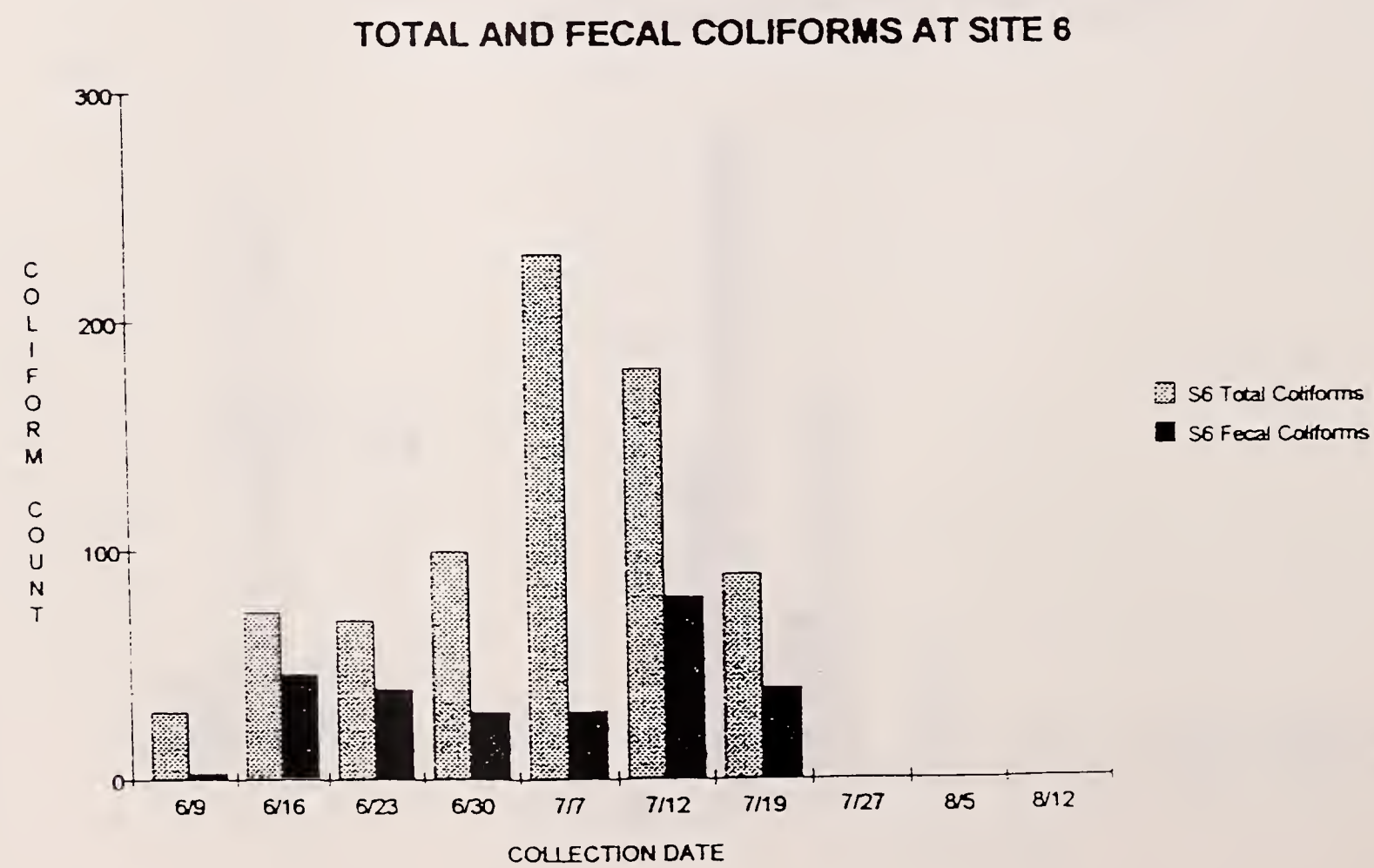

% SATURATION DISSOLVED OXYGEN AT SITE 4
% SATURATION
200
100
0
119
103
92.1
89.7
86.5
75.6
37.9
0
0
0
6/9
6/16
6/23
6/30
7/7
7/12
7/19
7/27
8/5
8/12
SAMPLING DATES

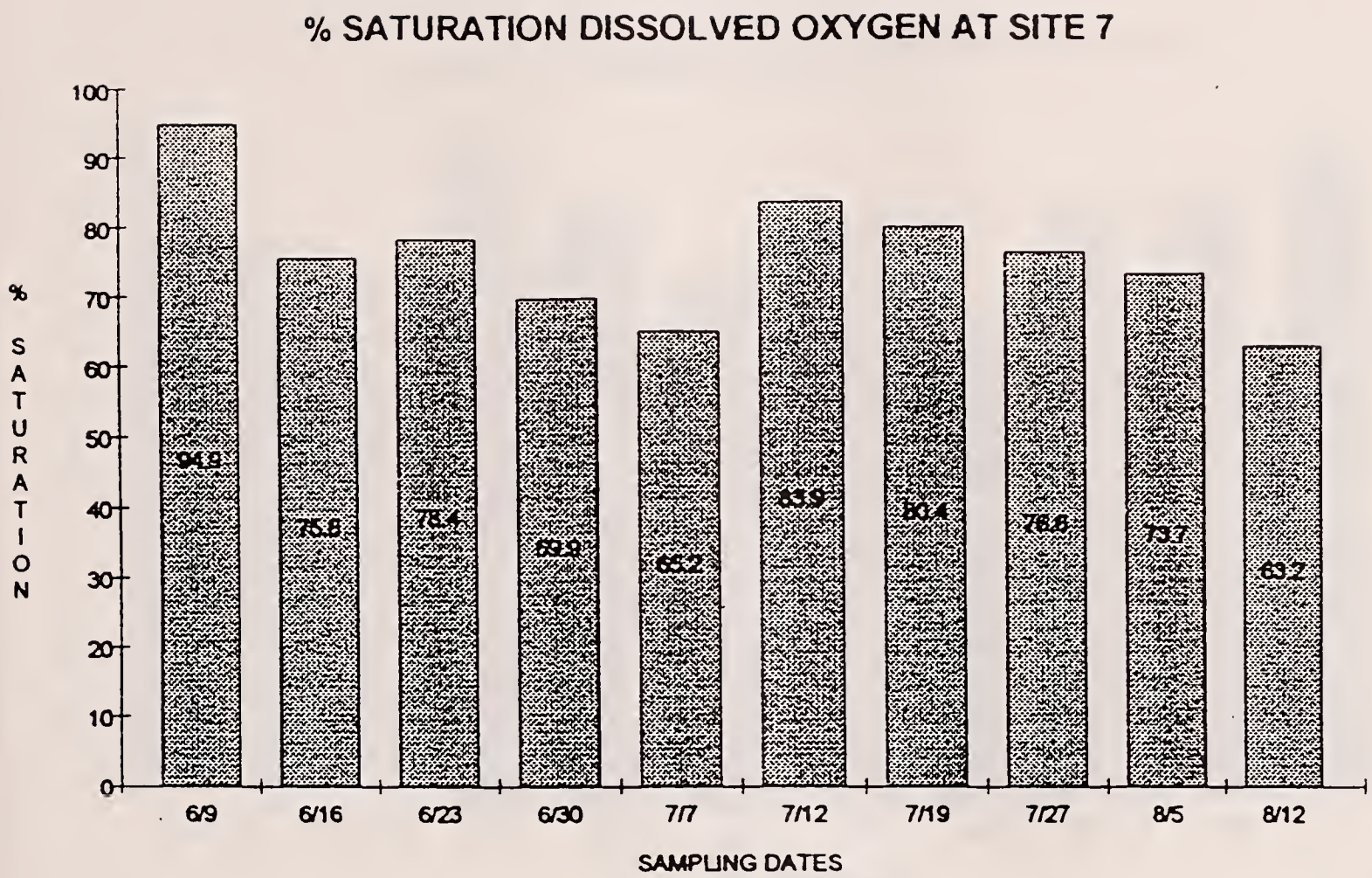

TOTAL AND FECAL COLIFORMS AT SITE 4
COLIFORM COUNT
300
200
100
0
S4 Total Coliforms
S4 Fecal Coliforms
6/9
6/16
6/23
6/30
7/7
7/12
7/19
7/27
8/5
8/12
COLLECTION DATE

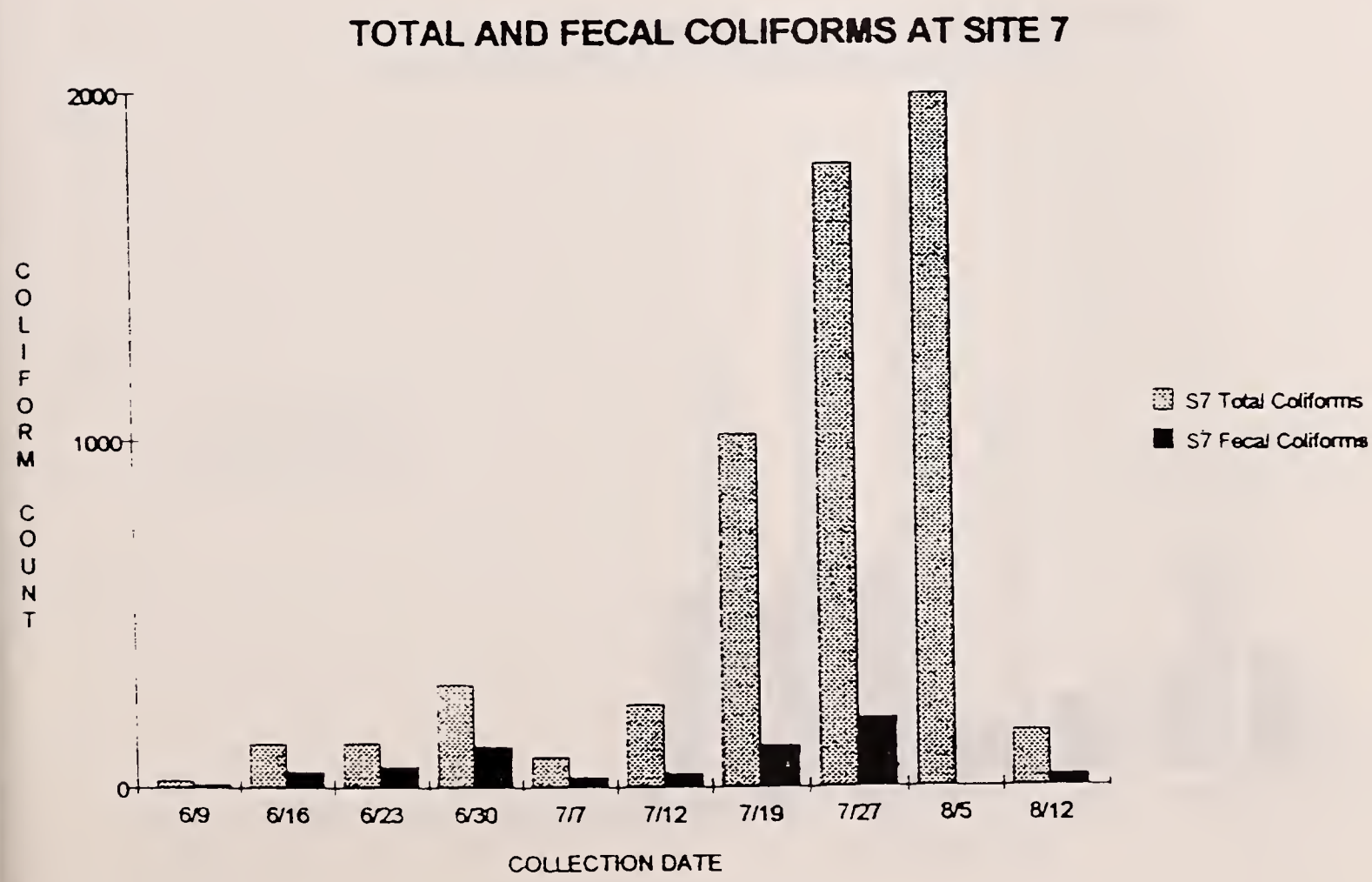

% SATURATION DISSOLVED OXYGEN AT SITE 5
% SATURATION
110
100
90
80
70
60
50
40
30
20
10
0
110
86.6
78.8
71.1
64.4
69.1
68.2
67.3
67
0
6/9
6/16
6/23
6/30
7/7
7/12
7/19
7/27
8/5
8/12
SAMPLING DATES

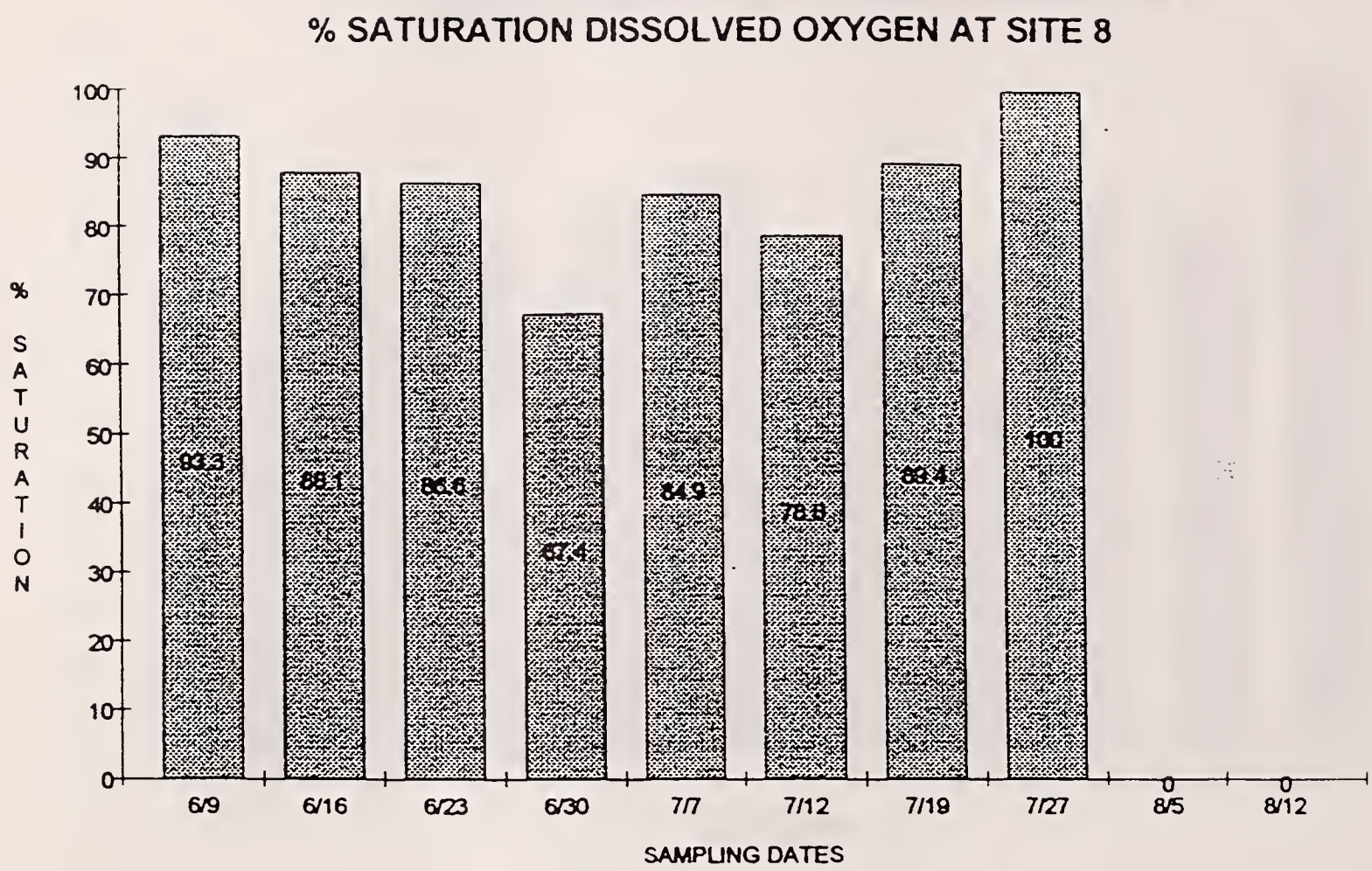

TOTAL AND FECAL COLIFORMS AT SITE 5
COLIFORM COUNT
6000
5000
4000
3000
2000
1000
0
6/9
6/16
6/23
6/30
7/7
7/12
7/19
7/27
8/5
8/12
COLLECTION DATE
S5 Total Coliforms
S6 Fecal Coliforms

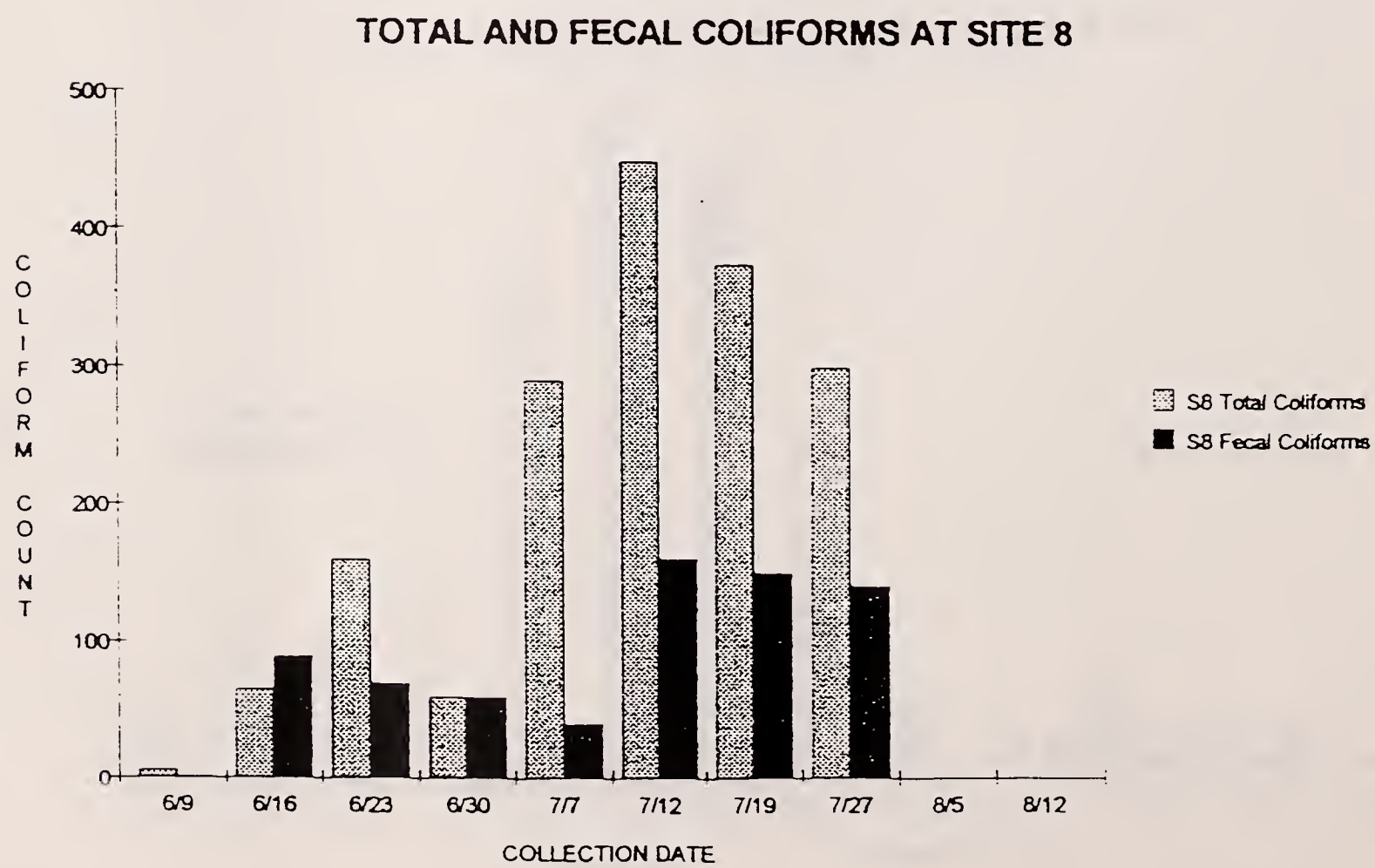

% SATURATION DISSOLVED OXYGEN AT SITE 6
% SATURATION
110
100
90
80
70
60
50
40
30
20
10
0
103
82.5
74.7
76.3
71.4
68.4
34.2
0
0
0
6/9
6/16
6/23
6/30
7/7
7/12
7/19
7/27
8/5
8/12
SAMPLING DATES

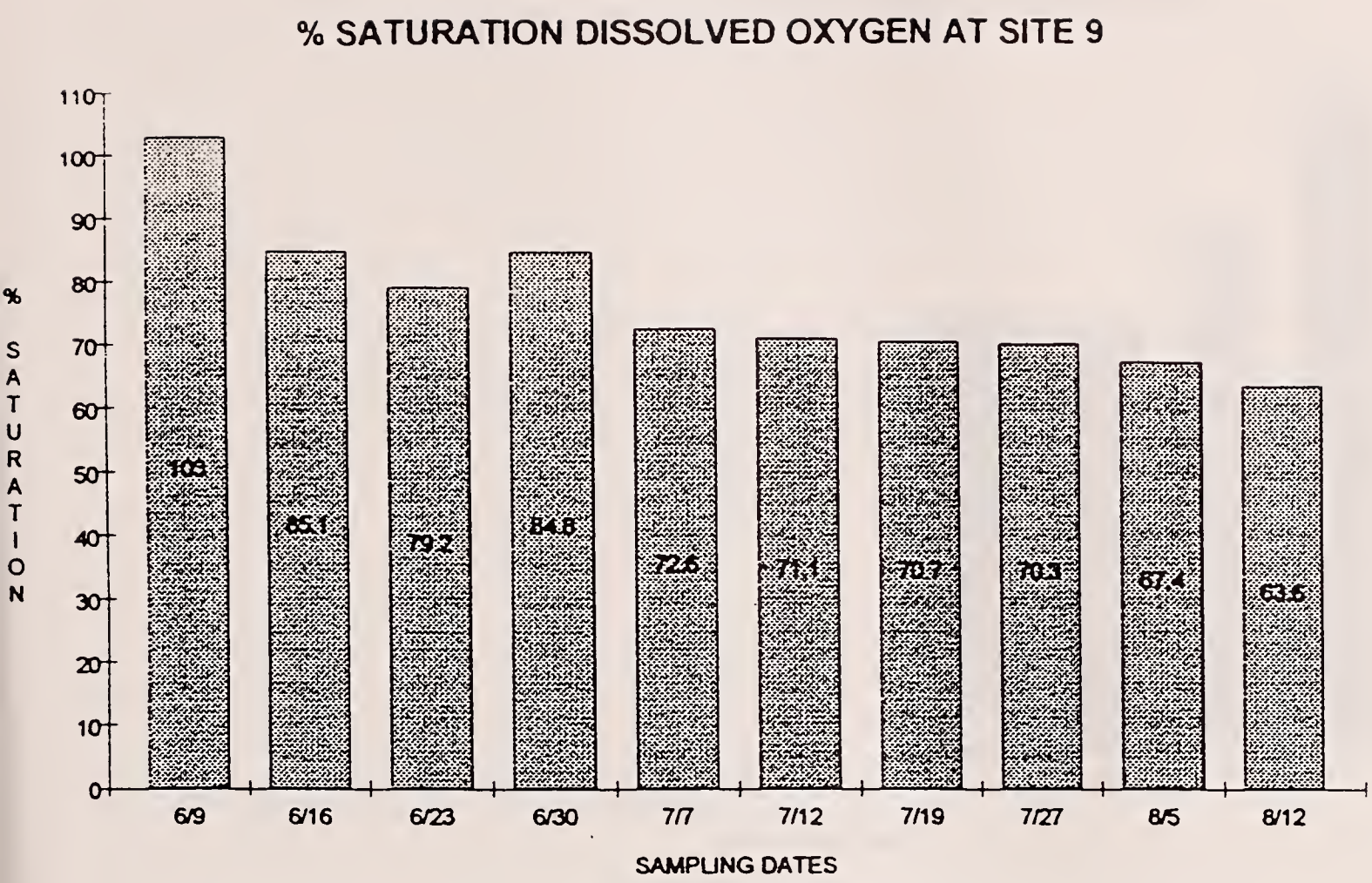

TOTAL AND FECAL COLIFORMS AT SITE 6
COLIFORM COUNT
300
200
100
0
6/9
6/16
6/23
6/30
7/7
7/12
7/19
7/27
8/5
8/12
COLLECTION DATE
S6 Total Coliforms
S6 Fecal Coliforms

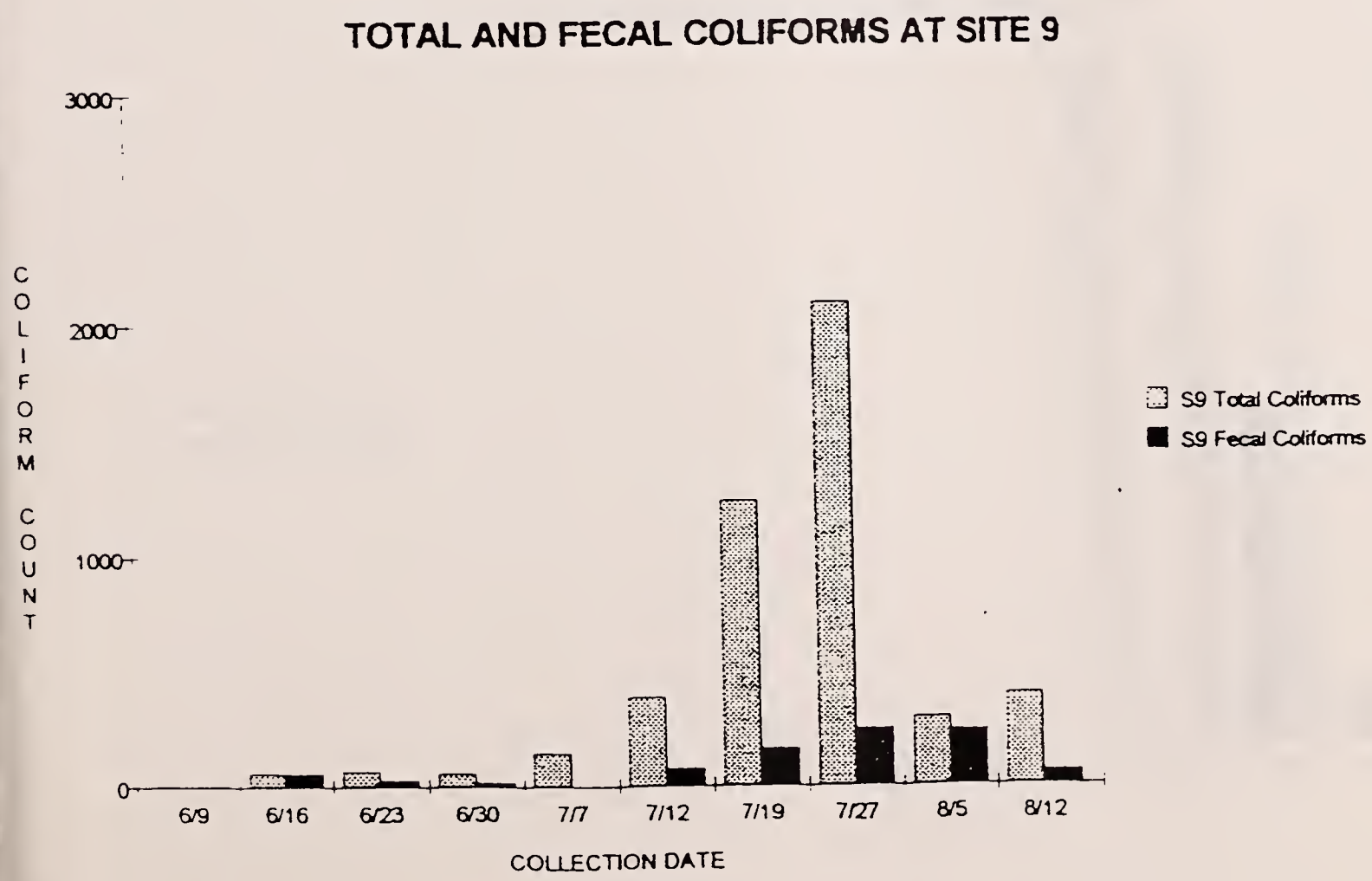

% SATURATION DISSOLVED OXYGEN AT SITE 7
% SATURATION
100
90
80
70
60
50
40
30
20
10
0
94.9
75.8
78.4
69.9
65.2
83.9
80.4
76.8
73.7
63.2
6/9
6/16
6/23
6/30
7/7
7/12
7/19
7/27
8/5
8/12
SAMPLING DATES

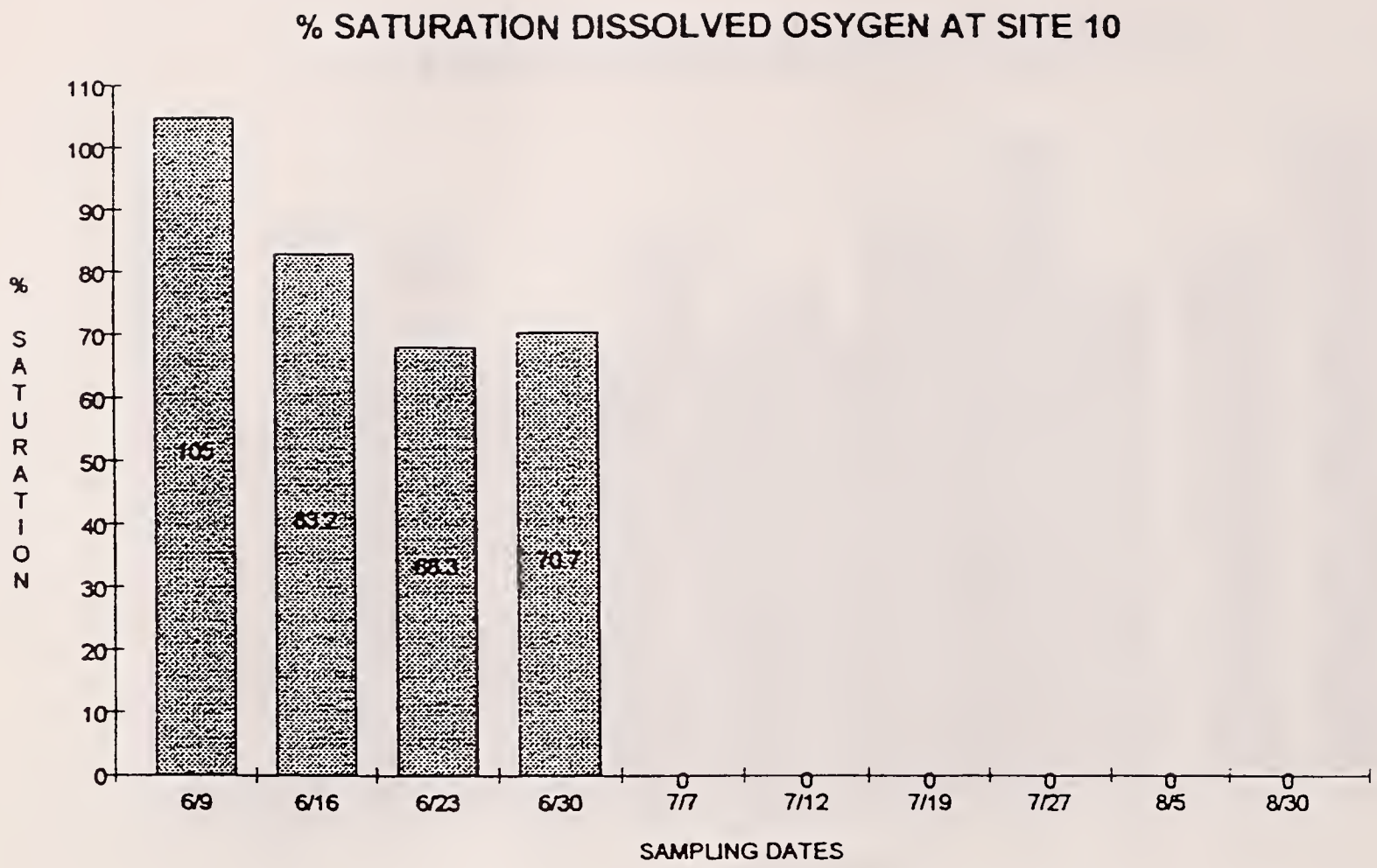

TOTAL AND FECAL COLIFORMS AT SITE 7
COLIFORM COUNT
2000
1000
0
6/9
6/16
6/23
6/30
7/7
7/12
7/19
7/27
8/5
8/12
COLLECTION DATE
S7 Total Coliforms
S7 Fecal Coliforms

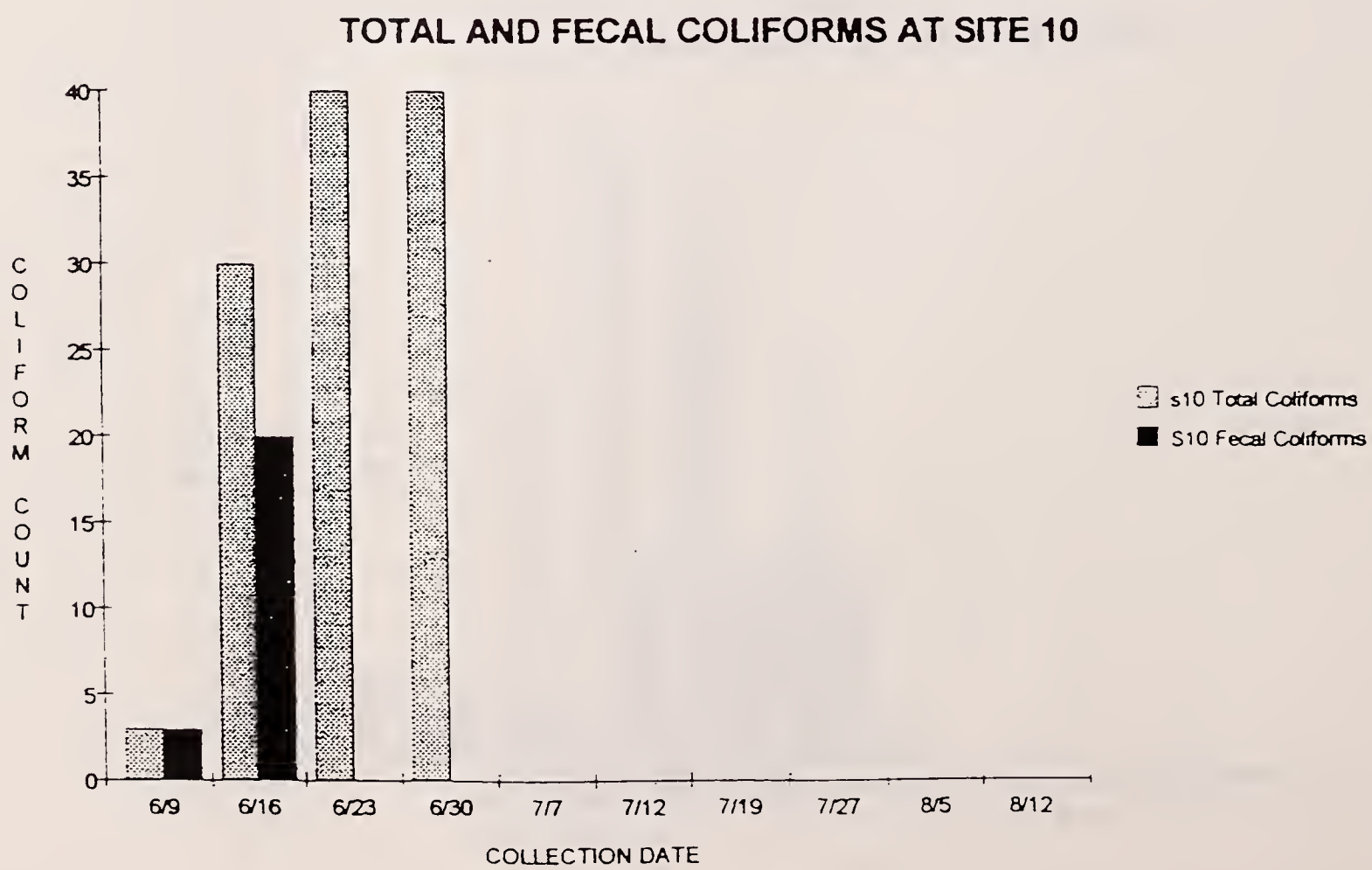

% SATURATION DISSOLVED OXYGEN AT SITE 8
% SATURATION
100
90
80
70
60
50
40
30
20
10
0
93.5
88.1
86.6
67.4
84.9
78.8
89.4
100
0
0
6/9
6/16
6/23
6/30
7/7
7/12
7/19
7/27
8/5
8/12
SAMPLING DATES


TOTAL AND FECAL COLIFORMS AT SITE 8
COLIFORM COUNT
500
400
300
200
100
0
6/9
6/16
6/23
6/30
7/7
7/12
7/19
7/27
8/5
8/12
COLLECTION DATE
S8 Total Coliforms
S8 Fecal Coliforms


% SATURATION DISSOLVED OXYGEN AT SITE 9
% SATURATION
110
100
90
80
70
60
50
40
30
20
10
0
103
85.1
79.2
84.8
72.6
71.1
70.7
70.3
67.4
63.6
6/9
6/16
6/23
6/30
7/7
7/12
7/19
7/27
8/5
8/12
SAMPLING DATES


TOTAL AND FECAL COLIFORMS AT SITE 9
COLIFORM COUNT
3000
2000
1000
0
6/9
6/16
6/23
6/30
7/7
7/12
7/19
7/27
8/5
8/12
COLLECTION DATE
S9 Total Coliforms
S9 Fecal Coliforms


% SATURATION DISSOLVED OSYGEN AT SITE 10
% SATURATION
110
100
90
80
70
60
50
40
30
20
10
0
105
83.2
68.3
70.7
0
0
0
0
0
0
6/9
6/16
6/23
6/30
7/7
7/12
7/19
7/27
8/5
8/30
SAMPLING DATES


TOTAL AND FECAL COLIFORMS AT SITE 10
COLIFORM COUNT
40
35
30
25
20
15
10
5
0
6/9
6/16
6/23
6/30
7/7
7/12
7/19
7/27
8/5
8/12
COLLECTION DATE
s10 Total Coliforms
S10 Fecal Coliforms

CADWELL CREEK WATER QUALITY MONITORING

Beginning 9/30/93 And Ending 12/23/93

Beverly Goudreau, Intern

Cadwell Creek is a stream within Gate 8 of the Quabbin, which empties into the reservoir. The entire watershed of Cadwell Creek is owned by the Metropolitan District Commission. In order to determine the bacteria levels that each of Caldwell Creek's tributaries discharges into the stream, samples were taken from 10 sites and analyzed for Total and Fecal Coliform. Dissolved oxygen and temperature were also analyzed, and the water level gage was read. Samples were taken once a week, beginning on 9/30/93 and ending on 12/23/93. During these thirteen weeks, the 10 sites were successfully sampled with the only exceptions being that on 9/30/93, 10/7/93, 10/14/93, and 10/28/93, Site 2 was dry, on 9/30/93 the water level gage was not read, and on 12/16/93 a dissolved oxygen reading was not obtained at Site 7, due to a problem with the D.O. meter. Beyond these exceptions, all analyses were completed and the data have been compiled and averaged.

The results of the analysis for Total Coliform averaged between 37 and 118 colonies/100ml. Sites 1,2,3,4 and 7 had the higher averages, ranging between 58 and 118 colonies/100ml. Sites 5,6,8,9 and 10 had lower averages, ranging between 37 and 48 colonies/100ml. Site 7 showed the highest average of 118, but there was also an unusual spike of 820 colonies/100ml on 10/21/93. Although the counts for all sites were high due to rainfall, this site had the highest count of any of the samples taken. It seemed abnormally high in comparison, and was perhaps due to a source within the water. If this amount is considered an anomaly and the figures re-averaged without the 10/21/93 results, the average would be 59 colonies/100ml. This would put all averages quite close and not very high, with Site 7 having the high of 65 and Site 10 with the low of 37.

The Total Coliform levels tended to fluctuate, with higher rainfall and water levels increasing counts, probably due to run-off, and falling temperatures decreasing counts. The samples taken on 10/14/93, 10/21/93 and 11/18/93 had the highest levels. The rainfall for the week, for each of these samples, was over one inch and there was an obvious increase in water level. Levels remained fairly steady between 11/23/93 and 12/23/93; with decreasing temperatures balancing high rainfall and high water levels, the average count was about 41 colonies/100ml.

There were several inconsistencies in the total and fecal coliform counts, in which the fecal counts were higher that the total counts; showing error. These inconsistencies were most likely caused by high non-coliform colony growth overcrowding and retarding the growth of the total coliform colonies, resulting in higher fecal coliform counts than total coliform counts. These occurred on 10/7/93 at Site 5, with confluent non-coliform colonies completely retarding the growth of total coliforms and with an extremely high fecal count of 2929 colonies/100ml, on 10/14/93 at Site 7 the counts were 238 total coliforms to 285 fecal coliforms,

and on 10/21/93 at Site 2 the counts were 70 total coliforms to 422 fecal coliforms.

The results of the fecal coliform testing showed average levels ranging from 6 to 242 colonies/100ml. Sites 1,2,3,4,5 and 7 showed the highest averages, ranging between 16 and 242 colonies/100ml. Sites 6,8,9 and 10 had the lowest averages, ranging from 6 to 11 colonies/100ml. Site 5 had the high average of 242, but it had an unusual and very high spike of 2929 colonies/100ml on 10/7/93. This amount is abnormally high in comparison to all other data from this site, as well as from all of the other sites and is probably due to a beaver or some other animal source nearby. If this amount is considered an anomaly and the data for this site are re-averaged without the 10/7/93 results, the average is 17 colonies/100ml and is more in line with the averages of the other sites. Site 2 also showed an unusually high count of 422 colonies/100ml on 10/21/93. Even though counts were high overall due to high rainfall, they were probably higher at Site 2 due to the fact that this site was sampled for the first time. This site had previously been dry and counts were most likely increased by run-off and sources within the dry stream bed itself. The average of the Site 2 data, excluding that of 10/21/93, is only 6 colonies/100ml. Considering these anomalies, levels were low ranging from 6 to 31 colonies/100ml.

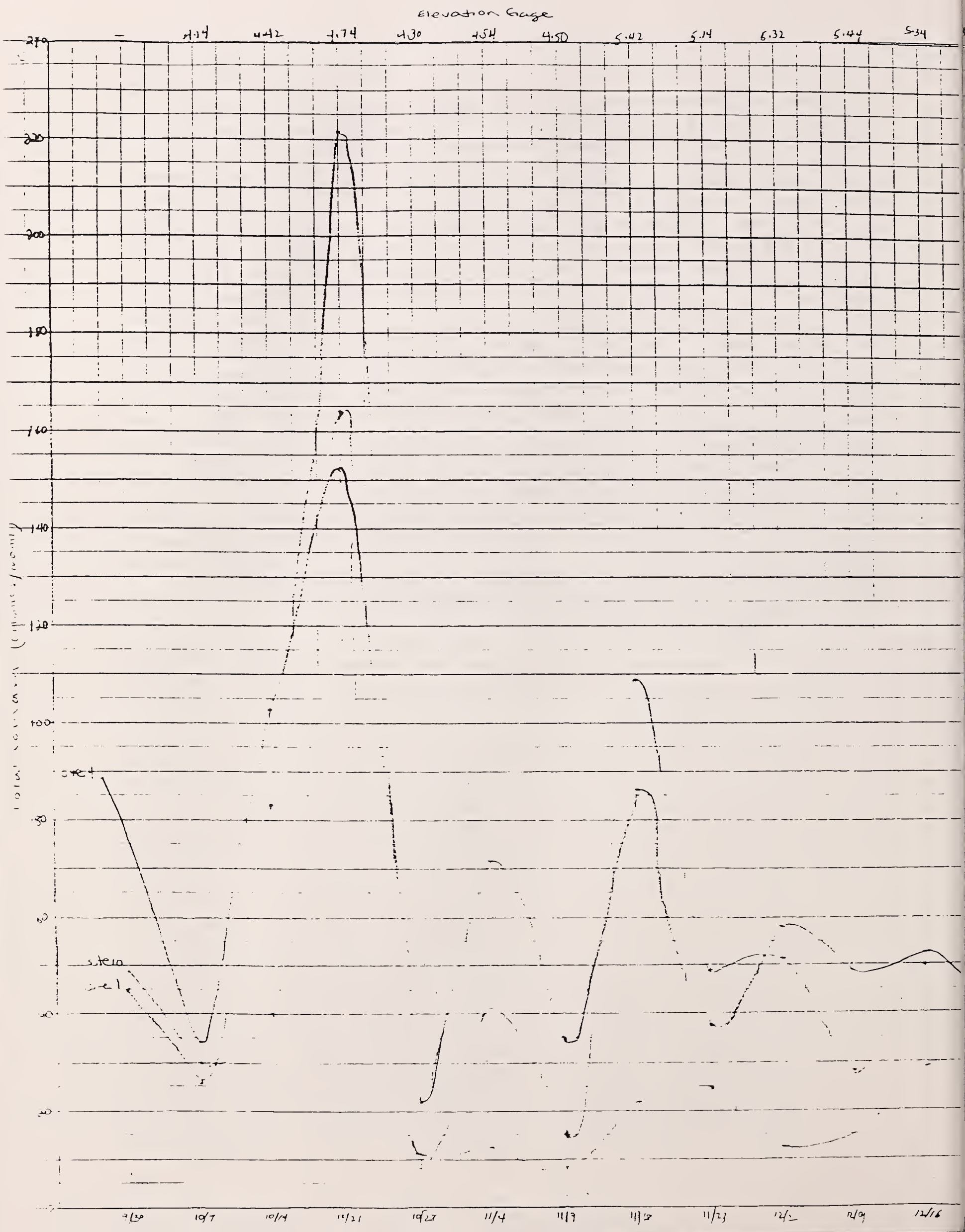
The results for Site 1, closest to the inlet to the reservoir, showed an average of 23 colonies/100ml. This amount is only slightly higher than 20 colonies/100ml, which is the Massachusetts Department of Environmental Protection drinking water standard for raw source water, and considering dilution before reaching the reservoir, levels are most likely quite low. If the effects of Site 2 on Site 1 are considered, then Site 1 also has an anomaly in that the 10/21/93 results of 170 colonies/100ml might have been much lower if Site 2 had not been flowing and with this considered the average may well be lower than 20 colonies.

The fecal coliform counts, like the total coliform counts, increased with rainfall and high water levels and decreased with falling temperatures. The high counts occurred on 10/14/93, 10/21/93 and 11/18/93, coinciding with high rainfall and high water levels, as well as the high counts for the total coliform. The levels dropped and remained fairly steady between 11/23/93 and 12/23/93 due to colder temperatures, and averaging about 2 colonies/100ml.

The water temperature changes occurring during the course of sampling ranged between a high of 11 degrees centigrade on 9/30/93 and a low of 1 degree on 12/23/93. With the dropping temperatures, the dissolved oxygen levels increased and the coliform counts decreased. The average temperatures ranged between 4 and 6 degrees, with Sites 1,2,3 and 4 having lower temperatures than Sites 5,6,7,8,9 and 10. The temperature difference between these sites accounts for the higher dissolved oxygen levels at Sites 1,2,3 and 4.

The dissolved oxygen levels were generally high, with averages ranging from 11.6 ppm to 12.3 ppm. While Sites 1,2,3 and 4 had the highest averages, and Sites 6,7,8,9 and 10 had the lowest, the percent saturation for all sites was high, with averages ranging between 93% and 96%. Sites 5, 6 and 7 had the highest percent saturation.

Although in most cases, the dissolved oxygen levels rose as temperatures decreased, the 10/28/93 data showed lower dissolved oxygen levels even though temperatures decreased. The percent saturation for the ten sites ranged between 81% and 89%. The coliform counts were low, so the decrease was most likely caused by heavy leaf litter and a decrease in the water level. There had been heavy leaf litter the previous two weeks, but the dissolved oxygen levels remained higher due to higher water levels and faster flow. The samples of 11/18/93 were super saturated, averaging 103%. The water level had risen 0.92 inches and the water was extremely rapid and most of the leaf litter had been washed away. The dissolved oxygen was low on 10/21/93 at Site 2. This stream had previously been dry and debris in the stream bed is the probable cause of the low 76%. The fecal coliform counts were also high. The percent saturation was lower on 10/7/93 at Site 5, coinciding with a very high fecal coliform count. A dissolved oxygen level was not recorded for 12/16/93 at Site 7, because of a problem with the D.O. meter.


Elevation Gauge
4.14
4.42
4.74
4.30
4.54
4.50
5.42
5.14
5.32
5.44
5.34
270
220
200
180
160
140
120
100
80
60
40
20
0
Total Volume (Gallons)
steio
9/30
10/7
10/14
10/21
10/28
11/4
11/9
11/18
11/23
12/2
12/9
12/16

ate	Elevation Gage	Change in Water Level	Rainfall	Average Temperature	Total Coliform*	Fecal Coliform*
9/30/93	----	----	1.27	10	49	20
0/07/93	4.14	----	0.46	10	24	298**
0/14/93	4.42	+0.28	1.31	5	87	58
0/21/93	4.74	+0.32	1.25	9	190	116
0/28/93	4.30	-0.44	0.16	8	13	3
1/04/93	4.54	+0.24	1.53	5	49	4
1/09/93	4.50	-0.04	0.35	3	23	1
1/18/93	5.42	+0.92	1.40	7	71	13
1/23/93	5.14	-0.28	0.38	4	37	1
2/02/93	5.32	+0.18	1.37	2	41	7
2/09/93	5.44	+0.12	2.32	3	39	1
2/16/93	5.34	-0.10	0.65	5	56	1
2/23/93	5.54	+0.20	1.07	2	37	1

Average of the 10 sites for that date.

* This number is high due to an abnormally high count at Site 5. If the 10/07/93 results are re-averaged without the Site 5 data, the average is 7.

TOTAL COLIFORM (Colonies/100ml)

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
09/30	45	--	55	89	39	50	57	31	27	49
10/07	26	--	21	34	*	24	21	20	13	30
10/14	83	--	109	103	53	104	238	25	26	40
10/21	222	70	127	153	126	81	820	135	117	164
10/28	8	--	3	32	19	8	19	11	9	11
11/04	41	97	60	72	62	23	38	42	42	13
11/09	15	46	31	35	16	13	34	21	15	8
11/18	109	86	111	86	73	37	114	33	40	22
11/23	49	53	35	37	28	18	26	18	41	25
12/02	51	49	57	58	49	21	33	28	51	13
12/09	28	39	33	49	31	54	38	29	41	48
12/16	50	50	54	53	65	74	67	62	57	29
12/23	35	33	55	40	18	33	26	41	63	25
Average	59	58	58	65	48	42	118	38	42	37

* Plate totally covered with confluent non-coliform colonies.

FECAL COLIFORM (Colonies/100ml)

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
09/30	26	--	29	18	30	38	19	7	4	13
10/07	8	--	10	5	2929	2	5	4	7	13
10/14	48	--	44	35	24	33	285	11	7	32
10/21	170	422	87	121	107	30	56	51	50	70
10/28	2	--	4	2	6	2	3	3	3	1
11/04	7	13	7	1	0	1	1	3	3	2
11/09	1	0	1	1	2	0	1	0	0	0
11/18	24	22	13	18	4	23	20	3	3	1
11/23	0	4	0	1	0	0	1	0	0	1
12/02	8	1	10	6	40	1	2	1	0	0
12/09	0	2	0	1	0	5	2	0	0	0
12/16	1	0	3	2	0	1	4	0	0	1
12/23	0	2	2	1	0	5	1	1	1	0
Average	23	52	16	16	242	11	31	6	6	10

TEMPERATURE (DEGREES CENTIGRADE)

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
09/30	9	--	9	9	9	10	10	11	10	10
10/07	9	--	9	10	10	10	10	11	10	10
10/14	4	--	4	5	5	6	7	6	6	6
10/21	8	8	8	9	9	9	9	9	9	9
10/28	7	--	7	7	7	8	8	8	8	8
11/04	4	4	4	5	5	6	5	6	6	6
11/09	2	2	2	2	3	4	3	4	4	4
11/18	6	6	6	7	7	7	6	7	7	7
11/23	3	4	3	4	5	5	5	5	5	5
12/02	2	2	2	2	3	2	2	3	3	3
12/09	3	3	3	3	3	3	2	4	4	4
12/16	5	5	5	5	5	5	5	5	5	5
12/23	1	1	1	1	2	2	1	3	3	3
Average	5	4	5	5	6	6	6	6	6	6

Dissolved Oxygen

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
09/30	10.2	----	10.4	11.0	10.0	9.8	10.5	9.8	9.8	9.6
10/07	11.0	----	11.0	10.4	9.4	10.2	10.0	8.8	9.4	9.8
10/14	12.6	----	13.0	13.0	12.0	11.8	11.6	11.6	11.6	11.8
10/21	11.2	9.0	10.6	11.0	10.8	10.8	11.0	11.0	11.0	11.0
10/28	9.8	----	10.0	10.6	9.8	10.4	10.6	10.2	10.2	10.2
11/04	12.4	12.0	12.4	12.4	12.2	12.0	12.4	11.8	12.2	12.0
11/09	13.2	13.0	13.0	13.2	13.2	12.8	13.2	12.4	13.0	12.6
11/18	12.4	12.2	12.8	12.4	12.8	13.0	13.2	12.6	12.2	12.0
11/23	13.0	12.6	12.8	13.0	12.6	12.8	13.0	12.2	12.4	12.4
12/02	13.0	12.6	12.8	12.6	12.2	12.8	13.2	11.8	12.0	11.8
12/09	13.0	13.0	13.0	13.0	12.6	13.2	13.2	12.4	12.2	12.2
12/16	12.6	12.4	12.4	12.6	12.2	12.4	----	12.2	12.2	12.0
12/23	13.6	13.6	13.8	13.6	12.4	12.6	13.4	12.8	12.8	12.6
Average	12.2	12.3	12.2	12.2	11.7	11.9	12.1	11.5	11.6	11.5

ELEVATION	GAGE	DISSOLVED OXYGEN PERCENT SATURATION									
		S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
09/30	---	88	--	90	95	87	87	93	89	87	85
10/07	4.14	95	--	95	92	83	90	88	80	83	87
10/14	4.42	97	--	100	102	94	95	96	93	93	95
10/21	4.74	95	76	89	95	93	93	95	95	95	95
10/28	4.30	81	--	82	87	81	88	89	86	86	86
11/04	4.54	95	92	95	97	95	96	97	95	98	96
11/09	4.50	95	94	94	95	98	98	98	95	100	97
11/18	5.42	100	98	103	102	105	107	106	104	101	99
11/23	5.14	97	97	95	100	98	99	102	95	97	97
12/02	5.32	94	91	93	91	91	93	95	88	89	88
12/09	5.44	97	97	97	97	94	98	95	95	94	94
12/16	5.34	98	97	97	98	95	97	--	95	95	94
12/23	5.54	96	96	97	96	90	91	94	95	95	93
Average	4.90	94	93	94	96	93	95	96	93	93	93

TABLE NO. I

INCHES OF PRECIPITATION AT Administration Building Belchertown MASS

YEAR ENDING DECEMBER 31, 19 93

Date	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				*0.29		0.04		T			0.20	
2				#0.12			0.17	0.09	T	0.36		T
3	0.03			*T		0.01		T	1.45	0.05	0.03	
4	0.31		0.17*		T	T		T		0.05	T	0.40
5	0.38		0.55*		0.20	0.40					0.35	1.92
6					0.05	0.09						T
7							0.59	T	0.06			T*
8			0.05#			0.08	0.71	0.73	0.73			T*
9				T		0.03			0.04	0.02		
10	0.03*		0.24#	0.21					0.27			0.45
11	0.04*			0.36	T					T	0.07	0.16#
12	0.42*	0.65*		0.15				T		1.27	0.03	
13	0.40#	0.06#	1.49#		0.03							0.04
14	0.05*		T	T						0.02	0.17	T
15	0.05*			T		0.15			0.19			
16		1.00#	0.06#	0.81	0.08			0.13	0.16			
17			0.86#	0.10				0.49	0.52	T	1.13	0.25*
18	T*				0.42			0.19	0.02			0.03#
19					0.02		0.61			0.36	0.38	0.17
20					0.02	0.06		0.31		0.42	T	0.56
21	0.18	0.42*	0.18*	0.01		0.42			2.23	0.47		
22	0.10	0.01*		0.33	0.05				0.03			
23		0.07*	0.85*	T					0.04			0.04*
24	0.42		0.32=		0.07			T				
25									T			
26				0.80	0.02	0.08	0.46		0.40	0.04		
27					T	0.12	0.44		0.87	0.11	T	
m28	T		0.83		0.04	0.20	0.32			0.01	1.37	
29			0.83				0.07				T	0.24
30	0.13*		T				0.48			0.35		
31	T		0.07		1.00					0.95		
SUM Precip.	2.54	2.21	6.50	3.28	2.00	1.68	3.85	1.94	7.01	4.48	3.73	4.23
SUM Snow-fall	11.5	15.00	33.5	0.25							T	8.0

Total Precipitation for the Year 43.51

Total Snowfall for the Year 68.25

* Snow

\# Snow, Rain & Sleet

T Trace

Station Established 7-1-39

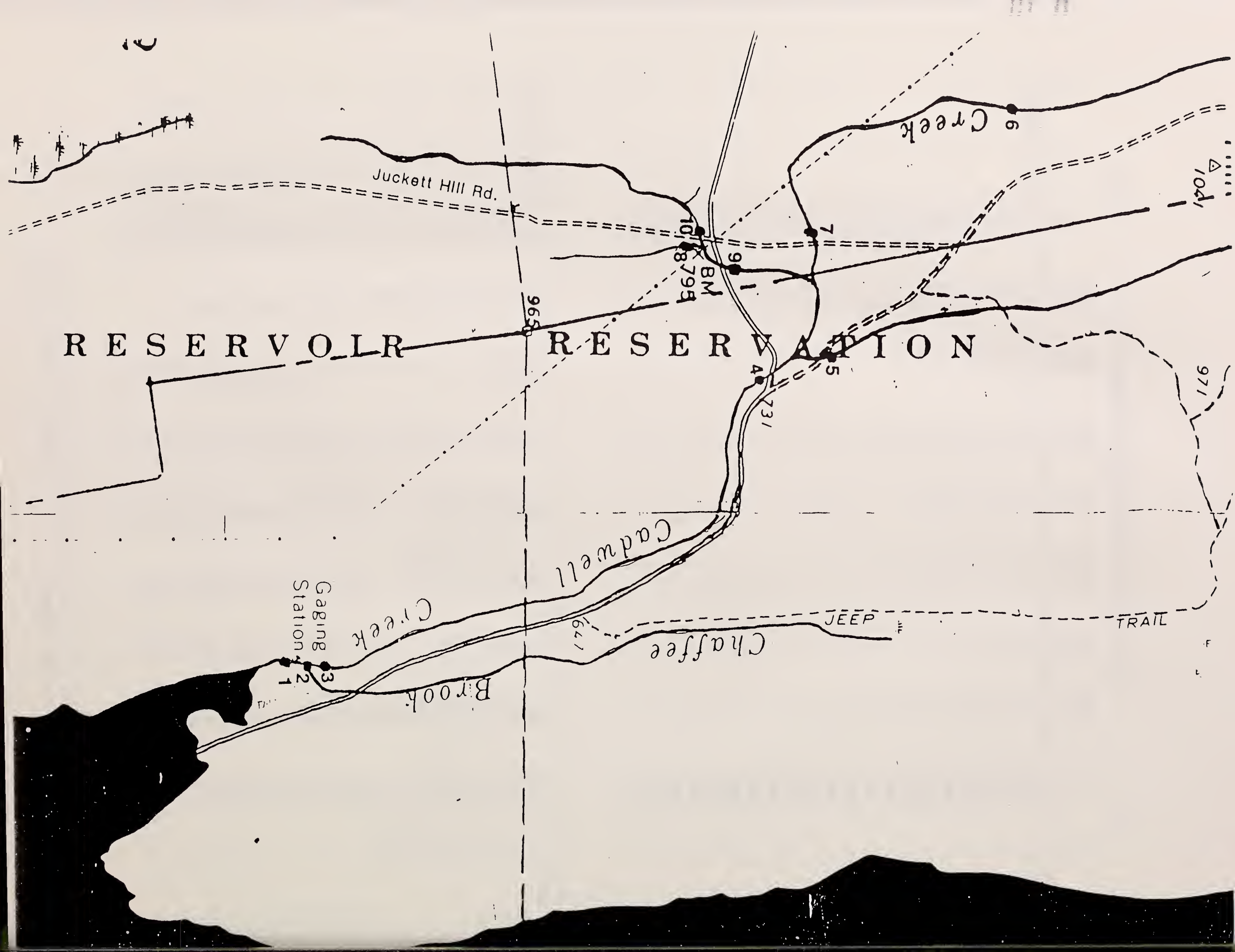
	DATE	SITE #1	SITE #2	SITE #3	SITE #4	SITE #5	SITE #6	SITE #7	SITE #8	SITE #9	SITE #10
D.O. (% SAT)	06/09/93	97	89	92	119	110	103	95	93	103	105
	06/16/93	104	86	93	103	87	83	76	88	85	83
	06/23/93	91	65	86	92	79	75	78	87	79	68
	06/30/93	81	*	84	90	71	76	70	67	85	71
	07/07/93	95	*	85	87	64	71	65	85	73	*
	07/12/93	96	*	89	76	69	68	84	79	71	*
	07/27/93	97	*	95	*	67	*	77	100	70	*
	08/05/93	81	*	89	*	67	*	74	*	67	*
	08/12/93	90	*	87	*	*	*	63	*	64	*
	09/30/93	88	*	90	95	87	87	93	89	87	85
	10/07/93	95	*	95	92	83	90	88	80	83	87
	10/14/93	97	*	100	102	94	95	96	93	93	95
	10/21/93	95	76	89	95	93	93	95	95	95	95
	10/28/93	81	*	82	87	81	88	89	86	86	86
	11/04/93	95	92	95	97	95	96	97	95	98	96
	11/09/93	95	94	94	95	98	98	98	95	100	97
	11/18/93	100	98	103	102	105	107	106	104	101	99
	11/23/93	97	97	95	100	98	99	102	95	97	97
	12/02/93	94	91	93	91	91	93	95	88	89	88
	12/09/93	97	97	97	97	94	98	95	95	94	94
	12/16/93	98	97	97	98	95	97	-	95	95	94
	[illegible]	96	[illegible]	97	[illegible]	90	91	94	95	95	93
COLIFORM TOTAL/FECAL PER 100 ml M.F.	06/09/93	16/9	TNTC/43	13/6	28/27	72/102	30/3	21/9	6/1	6/4	3/3
	06/16/93	110/82	100/40	126/66	36/27	120/80	73/46	128/46	65/89	60/60	30/20
	06/23/93	30/70	140/100	120/30	50/20	120/60	70/40	130/60	160/70	70/30	40/30
	06/30/93	50/10	*	0/0	30/20	130/30	100/30	300/120	60/60	60/20	40/9
	07/07/93	20/20	*	40/0	50/0	130/10	230/30	90/30	290/40	150/0	*
	07/12/93	70/20	*	80/20	180/60	1200/50	180/80	240/40	450/160	390/80	*
	07/27/93	600/280	*	400/190	*	5500/2770	*	1800/200	300/140	2100/250	*
	08/05/93	500/50	*	300/30	*	300/0	*	2000/0	*	300/240	*
	08/12/93	130/10	*	60/11	*	*	*	160/34	*	400/60	*
	09/30/93	45/26	*	55/29	89/18	39/30	50/38	57/19	31/7	27/4	49/13
	10/07/93	26/8	*	21/10	34/5	0/2929	24/2	21/5	20/4	13/7	30/13
	10/14/93	83/48	*	109/40	103/35	53/24	104/33	238/285	25/11	26/7	40/32
	10/21/93	222/170	70/422	127/87	153/121	126/107	81/30	820/56	135/51	117/50	164/70
	10/28/93	8/2	*	3/4	32/2	19/6	8/2	19/3	11/3	9/3	11/1
	11/04/93	41/7	97/13	60/7	72/1	62/0	23/1	38/1	42/3	42/3	13/2
	11/09/93	15/1	46/0	31/1	35/1	16/2	13/0	34/1	21/0	15/0	8/0
	11/18/93	109/24	86/22	111/13	86/18	73/4	37/23	114/20	33/3	40/3	22/1
	11/23/93	49/0	53/4	35/0	37/1	28/0	18/0	26/1	18/0	41/0	25/1
	12/02/93	51/8	49/1	57/10	58/6	49/40	21/1	33/2	28/1	51/0	13/0
	12/09/93	28/0	39/2	33/0	49/1	31/0	54/5	38/2	29/0	41/0	48/0
	12/16/93	50/1	50/0	54/3	53/2	65/0	74/1	67/4	62/0	57/0	29/1
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	26/1	[illegible]	[illegible]	[illegible]

* NO FLOW - NO SAMPLE

	DATE	SITE #1	SITE #2	SITE #3	SITE #4	SITE #5	SITE #6	SITE #7	SITE #8	SITE #9	SITE #10
TEMP. (DEG. C.)	06/09/93	13	13	13	14	15	17	16	13	13	13
	06/16/93	15	15	14	16	17	17	18	15	15	15
	06/23/93	14	14	14	15	16	16	17	17	15	15
	06/30/93	16	*	15	17	17	17	19	18	16	16
	07/07/93	19	*	18	22	21	20	22	19	18	*
	07/12/93	17	*	16	18	17	18	19	16	17	*
	07/27/93	15	*	15	*	15	*	16	15	15	*
	08/05/93	17	*	16	*	17	*	18	*	18	*
	08/12/93	16	*	16	*	*	*	18	*	16	*
	09/30/93	9	*	9	9	9	10	10	11	10	10
	10/07/93	9	*	9	10	10	10	10	11	10	10
	10/14/93	4	*	4	5	5	6	7	6	6	6
	10/21/93	8	8	8	9	9	9	9	9	9	9
	10/28/93	7	*	7	7	7	8	8	8	8	8
	11/04/93	4	4	4	5	5	6	5	6	6	6
	11/09/93	2	2	2	2	3	4	3	4	4	4
	11/18/93	6	6	6	7	7	7	6	7	7	7
	11/23/93	3	4	3	4	5	5	5	5	5	5
	12/02/93	2	2	2	2	3	2	2	3	3	3
	12/09/93	3	3	3	3	3	3	2	4	4	4
	12/16/93	5	5	5	5	5	5	5	5	5	5
	12/23/93	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
D.O. (PPM)	06/09/93	10.2	9.3	9.7	12.3	11.1	10.0	9.4	9.3	10.8	11.0
	06/16/93	10.5	8.7	9.6	10.2	8.4	8.0	7.2	8.9	8.6	8.4
	06/23/93	9.4	6.7	8.9	9.3	7.8	7.4	7.6	8.4	8.0	6.9
	06/30/93	8.0	*	8.5	8.7	6.9	7.4	6.5	6.4	8.4	7.0
	07/07/93	8.8	*	8.1	7.7	5.8	6.5	5.8	7.9	6.9	*
	07/12/93	9.3	*	8.3	7.2	6.7	6.5	7.8	7.8	6.9	*
	07/27/93	9.8	*	9.6	*	6.8	*	7.6	10.1	7.1	*
	08/05/93	7.9	*	6.4	*	6.5	*	7.0	*	6.4	*
	08/12/93	8.9	*	8.6	*	*	*	6.0	*	6.3	*
	09/30/93	10.2	*	10.4	11.0	10.0	9.8	10.5	9.8	9.8	9.6
	10/07/93	11.0	*	11.0	10.4	9.4	10.2	10.0	8.8	9.4	9.8
	10/14/93	12.6	*	13.0	13.0	12.0	11.8	11.6	11.6	11.6	11.8
	10/21/93	11.2	9.0	10.6	11.0	10.8	10.8	11.0	11.0	11.0	11.0
	10/28/93	9.8	*	10.0	10.6	9.8	10.4	10.6	10.2	10.2	10.2
	11/04/93	12.4	12.0	12.4	12.4	12.2	12.0	12.4	11.8	12.2	12.0
	11/09/93	13.2	13.0	13.0	13.2	13.2	12.8	13.2	12.4	13.0	12.6
	11/18/93	12.4	12.2	12.8	12.4	12.8	13.0	13.2	12.6	12.2	12.0
	11/23/93	13.0	12.6	12.8	13.0	12.6	12.7	13.0	12.2	12.4	12.4
	12/02/93	13.0	12.6	12.8	12.6	12.2	12.8	13.2	11.8	12.0	11.8
	12/09/93	13.0	13.0	13.0	13.0	12.6	13.2	13.2	12.4	12.2	12.2
	12/16/93	12.6	12.4	12.4	12.6	12.2	12.4	-	12.2	12.2	12.0
	12/23/93	[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

* NO FLOW - NO SAMPLE

Continued next page


Juckett Hill Rd.
RESERVOIR RESERVATION
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